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Vol. 34 FEBRUARY, 1948 No. 2

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American Journal
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VOL. 34 FEBRUARY, 1948 NO. 2

PRACTICE MANAGEMENT

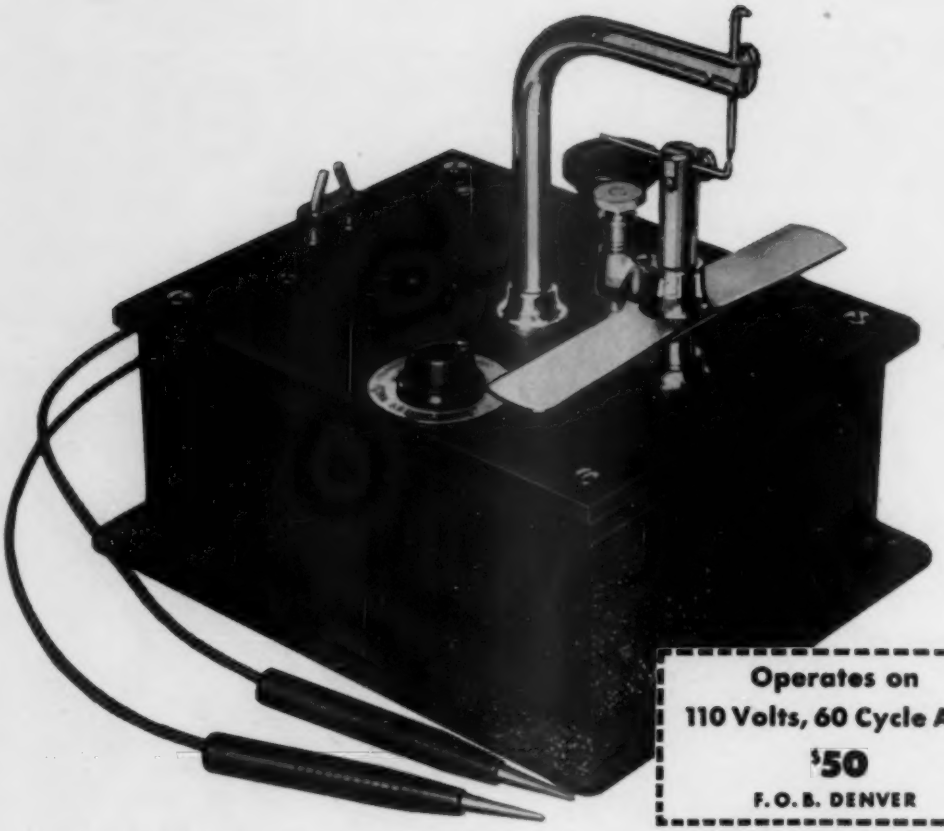
GEORGE M. ANDERSON, D.D.S., BALTIMORE, MD.

AN ORTHODONTIC practice offers many problems in successful management. The effort divides naturally into two basic fields: (1) clinical or case management; (2) general office or business procedure or practice management. We are concerned with the latter. An orthodontist may have a high rating as a clinical operator with far better than average results, yet his managerial ability may leave much to be desired. There *is* some excuse for the situation. The professional man seldom has had business experience prior to entrance into dental school and he learns, therefore, the things that are good and bad for him through experience. In his undergraduate and graduate training he has had courses carefully planned as to clinical and scientific content, but office training received scant attention. To be sure, he may have had some opportunity toward instruction which combined ethics, jurisprudence, and business, but it was not too severe and it was taken rather lightly. It is reasonable, therefore, to find practice management ability at a low level as compared to the clinical fields.

Each orthodontist here has developed methods or is in the process of developing methods for the conduct of his practice. In the main, because of individual peculiarities, those methods prove beneficial and suggestions I shall make may not provide you with changes or additions which will have more merit than those you now use. However, since most professional men constantly seek to better their ability, as is proved by the meetings they attend and the journals they read, those who contribute to programs can feel, if but a few receive some benefit therefrom, that the presentation is worth making.

There is a considerable number of younger men present who are bound, through their interest in the clinical phases of orthodontics, to concentrate their efforts in that direction to such an extent as to cause them to neglect giving sufficient time to planning and developing sound office procedure. They will

Presented at the meeting of the Northeastern Society of Orthodontists, New York City, March 11, 1947.



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Presented at the meeting of the Northeastern Society of Orthodontists, New York City, March 11, 1947.

find, as others have learned, that good management will provide better opportunity for clinical improvement because good management will relieve them of certain worries and concern related to the conduct of a practice. Those problems begin to multiply as soon as the desire to enter special practice is first considered.

The choice of office location and arrangement of space is more than a matter of finding a place to start practice. First impressions are most important. They speed you or slow you; they influence you for a long time. Whether you rent, buy, or build, choose to be in the center of a large city or not so centrally located or choose to practice in a smaller community, you will still find that a most important point is to provide yourself with enough well-located space so that if you like where you are and what you have, circumstances will not force your removal. I speak from experience in this matter, for in a period of five years I had three locations. It was annoying and expensive to change, and the varied reactions of my patients were an education. Because of this, when young men interested in orthodontics have discussed some of their problems with me, the answer invariably has been that orthodontics is a large and growing field of practice, and that if they prepare themselves and apply their knowledge, it would not be too long before they would be somewhat amazed at the amount of work they would be called upon to do. Therefore, though prudence would seem to indicate that the needs of the practice at the moment did not seem to justify the location, size and arrangement of space, it is wise to think about them and to plan for them. You will find this to be especially true because of the need for ample space to store plaster casts and other necessary records unique to the practice of this specialty. They accumulate rapidly and soon present an amazing volume for which space somewhere must be made available. Certain of the records must receive better than average care. These include special correspondence, diagnostic data, and financial records, the loss or even temporary displacement of which may be embarrassing. One of the earliest purchases of equipment I made when starting practice was a large steel fireproof safe for such active records. I was kidded a bit about its size and my optimism, and yet the purchase of that safe proved one of the most satisfactory things I ever did, for it still serves its intended purpose and I have not found it to be insufficient for my needs. I had my expense once, and though it was considerable, have had no need for replacement expense.

The next problem is the patient. The first contact or consultation effort should not be a show-off or an inconsequential effort. Those few minutes are as important as anything you will do for that patient. You may not think it advantageous in the beginning when the volume of your practice is small to consider worth while setting aside an hour each day which you can truthfully call and insist upon as the "consultation hour." If you will try it, you will grow to appreciate it and psychologically your patients will develop a respect for it. The hour of two to three in the afternoon, three afternoons a week is the time I have found best suited to devote to this purpose. When a new patient telephones for an appointment, the secretary states that our consultation

hour is from 2 to 3 P.M. on certain days. Some parents immediately object, stating without thought that the patient goes to school, but when they are told that our practice is essentially school children and that a better consideration of their child's problem can be given by providing sufficient time free from the busier treatment periods, most of them are readily agreeable. Several years' experience with this matter have convinced me that setting aside a specific time for consultation hour is an advantageous time arrangement.

There had always been a confusion surrounding this consultation problem, for, while I desired and expected to be paid for my effort, a good many patients took it for granted payment was not necessary. Some new patients had been good enough to ask if there was a charge; others would simply walk out, and if a bill was sent they would ignore it or call up and tell me they had no idea there was a charge. This difficult issue finally was settled in a rather simple manner. I now have a card which is handed to the patient or parent before I see them and which the recipient is requested to fill out (Fig. 1). This is done in the reception room before I see the patient. The important thing is that at the bottom of the card, in plain print, the patient reads: *Consultation fee:* _____

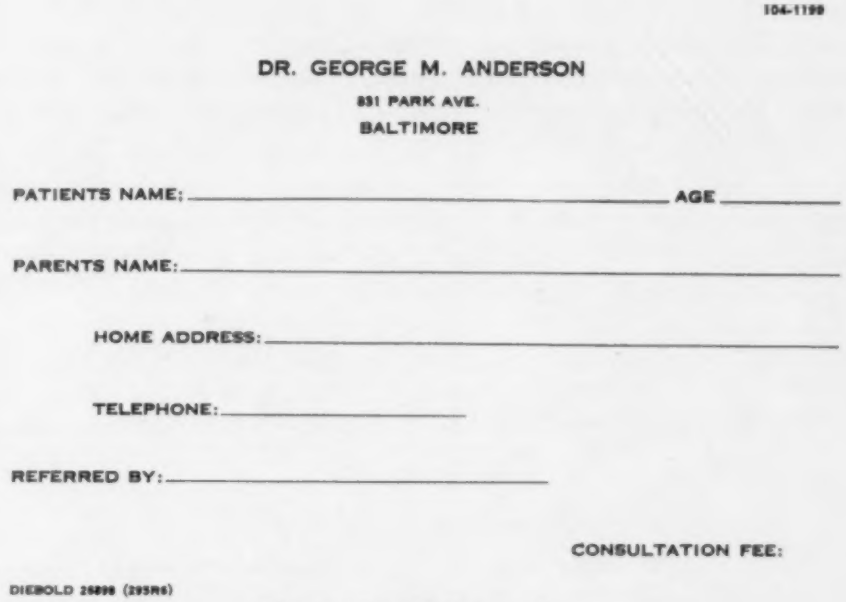

Fig. 1.—Consultation card.

I collect most of these at the consultation time. Before creating this card and placing a statement as to fee where it can be seen plainly, I didn't collect many of them. Some of you may think of a rather small consultation fee, others may have more inflated ideas, but the point is to make a charge; not one that will burden people, keep them away, or make them feel that they are paying too much if they come. However, no office can be maintained beneficially wherein a large number of people are constantly seen at no charge when, as an

actual matter of financial commonsense, it is well known that overhead exists. You can set any consultation fee you desire, but the main point is to set one and let the patients know before you see them that they are going to pay for that visit. If, when they see this plainly written on the card, they don't want to pay, they have the opportunity to get up and walk out of your reception room before the time comes to see you. That will happen, but you could hardly consider the person who leaves under such circumstances very worth while.

The discussion we have with the parent or patient at the consultation period justifies a very careful effort on your part. The tendency is to "book" the patient, when for the good of everyone the tendency should be to explain fully the general responsibilities of parent, patient, and operator, finishing off with a more detailed description of the problems concerned with the case under consideration. Because of inattentive parents, the fact that a mother so often comes without the father, thereby leaving an opening for misunderstanding or lack of clarity when mother and father later discuss matters, or of a child who causes interruptions and conflict in our explanatory efforts, or of our own office problems, such as telephone answering and secretarial questions, I find it desirable and distinctly advantageous to provide a pamphlet which is not too large or involved. This gives a general answer to many questions parents ask, and a specific letter regarding the particular case may be sent at a later date. There are times when it is better to excuse the child from the actual dental office, send him into the reception room, and suggest to the parent that we sit down in our private office for a talk concerning the problem. In that way we have a minimum of interference. If this arrangement is not possible, a separate parental appointment will have its advantages. The consultation period is a valuable effort, and its results will be in keeping with what you make of it. The small four-page pamphlet which we provide reads as follows:

INFORMATION REGARDING ORTHODONTIC TREATMENT

Being given by

DR. GEORGE M. ANDERSON,

831 PARK AVENUE, BALTIMORE, MARYLAND

ORTHODONTIC treatment is a slow procedure. Its object is improvement and not perfection. Time, patience, and perseverance are important factors in obtaining the desired result. The treatment may be divided into two parts.

A—Active—When appliances are actually moving the teeth into the desired positions. Adjustments, during this period, must be mild and infrequent since the manipulation of appliances results in a change in the bone surrounding the roots of the teeth.

B—Passive—When the teeth are not being moved but are supported and retained in their new positions by appliances.

Should the parent, patient, or orthodontist in either period fail to appreciate definite responsibilities, the treatment program will undoubtedly be ineffective.

An appliance is designed for each individual patient. It is delicate and must be given care. The patient must not eat hard or sticky candy or similar substances, and must refrain from breaking or loosening the appliance by playing with it in any manner. Any broken or loose band or wire delays treatment. Since the appliances are made of gold and platinum alloys, an additional charge is necessary for replacement caused by loss or intentional breakage or failure to obey instructions. If at any time the appliance does break or become loose, regardless of the reason, patient is advised to telephone immediately for an appointment.

Upon insertion of an appliance the teeth are apt to become sore. If the soreness does not diminish within forty-eight hours, this office should be notified. If there is irritation of the lip, tongue, or cheek, the irritating point may be covered with softened wax or even chewing gum to obtain immediate relief.

Appliances do not injure the teeth when proper care as to oral hygiene is exercised, but during treatment it is required that the patient see the general dentist at least twice a year for examination as to cavities and prophylaxis. All teeth with or without appliances are subject to decay and periodic examination will minimize the possibility of harm from cavities.

In treating certain types of malocclusion it is necessary that the patient wear small rubber bands. Instructions for this are given at the time and failure to obey wholeheartedly makes it very difficult to obtain the desired results.

At the completion of the first part of treatment, appliances are removed from the teeth and when needed, a small "removable retainer" is substituted. This is worn night and day and is taken out only for eating meals and cleaning the teeth, until otherwise instructed. The retainer, as with all appliances, must be kept scrupulously clean while on the teeth. In summer as a precaution against loss the retainer should not be worn while swimming. Care at all times must be given the retainer and, if lost, the cost of constructing a new one will be charged. If there has been a relapse of the teeth because of the loss, requiring resumption of active treatment, further charge for such service will be made.

During the summer, due to absence from the city, a patient may find it impossible to keep our appointments. Whether or not the case will necessitate care by another orthodontist during the absence can be determined only according to the needs of the particular case. In such an instance, the patient will assume responsibility for payment of the necessary service.

At times, I may be absent from my office. There is always someone here who is qualified to arrange for necessary attention.

Cooperation is requested in making and keeping appointments as our working time is limited due to the few hours school children are able to come to the office. Failure to keep scheduled appointments simply means delay in completion of treatment. Every effort is made on our part not to interfere with school but when necessary your indulgence will be appreciated.

All cases are taken with the understanding of cooperation on the part of parent and patient. Otherwise it is better to remove appliances and discontinue treatment.

If any question arises in regard to the proposed treatment or its progress, we hope that you will be good enough to communicate with us. We are anxious to have a successful and pleasant association and shall do everything to make it so.

In addition, we provide a card which is prepared for a specific purpose, so that parents have no doubt as to their responsibility for the general care of their children's teeth. The card reads:

THIS IS AN IMPORTANT NOTICE TO ALL MY PATIENTS AND THE PARENTS OF MY PATIENTS

Everyone should go to his dentist at least twice a year for examination as to cavities and cleaning of the teeth. This is the work of your dentist and does not come under the work of the specialist who straightens teeth. Many go twice yearly to their dentist and for them this reminder will not be so important. Others fail for one reason or another to do so. To them I emphasize the need for twice yearly visits. It makes no difference what time in the year. The important point is to do it *REGULARLY TWICE A YEAR*. It is extremely important that those who wear appliances for straightening the teeth conform to this suggestion.

Sincerely,

GEORGE M. ANDERSON, D.D.S.

831 PARK AVENUE, BALTIMORE

Experience has shown that orthodontic treatment should not be undertaken without a specific statement as to the financial arrangement and the same letter should refer to any particular treatment problem or difficulty. It has been our experience that parents can be forgetful as the months pass, or one parent may authorize the beginning of work when the other parent knows little or nothing as to details and is disturbed by the extent to which he has become involved. Paragraphs from a letter recently received follow. My first letter to both parents, following the talk I had with the mother at the consultation period, was the customary one. The reply indicates why you cannot be too careful. It reads:

Baltimore, January 15, 1947

Dear Dr. Anderson:

I received your letter dated January 10th and it is very fortunate that you wrote it, since this avoids a complete misunderstanding.

From your letter I see that the cost may be even more than I had expected or that my wife understood.

A further carefully written reply satisfied the father, the patient is under treatment, we each understand our objectives and our responsibilities, and, as the father says, a misunderstanding was avoided by reasonable precautions.

Each orthodontist must develop his fee schedule according to his field of practice, but there are certain fundamentals which apply to all. Many cases have been accepted on a flat fee basis; the easy ones frequently overpaid and the orthodontist paid in the end for the hard ones his judgment had failed to foresee. Because of financial and legal complications, there are few cases that may be safely accepted on a flat fee basis. It is not possible for us to be right in

our diagnosis at all times, for the circumstances causing and continuing to be responsible for a malocclusion are not always recognized, and noncooperative children and parents are apparently an inescapable burden. These cases run on and on, devouring all profit, adding the cost item to the worry of failure to treat successfully. To avoid this, we have a fee arrangement which has proved fair. A charge is made for one, two, three, or four years, depending upon the case. Then, after whatever basic year period charge is quoted, an *appointment charge* is stated for services which may evolve if the case, for reasons unforeseen, should continue beyond the estimated length of treatment. This keeps us from working for absolutely nothing and does not permit our hard, long-drawn-out cases to eat up the profits on a case we have been able to treat in a more accurate appraisal as to time and individual. Practically everyone has accepted this finishing off appointment charge without complaint. It is an ideal arrangement for a return for a protracted retention period. It is a fair approach and we prefer it to a charge by the year for an indefinite number of years when we know the last part of the treatment will have few visits in a year. Parents are not dumb; they know when they are paying a lot for very little. In addition, you have a restrictive action on patients who "just pass by" and think to drop in. The appointment charge has not always kept them away but it has slowed them down.

DATE	FAILED	CANCELLED	IMP.		X-RAY		SEP.	BANDS			WIRES			WIRES					LEFT OFF	RUBBERS			REF.	PROPHY	RETAINERS			
			WORK	RECORD	EXTRA	DENTAL		MOLAR	INCISOR	CEMENT	LABIAL	LINGUAL		SPRINGS	BP	BR. & REP	ADJ.			DAY	NIGHT	DISC.			INSERT	ADJ.	NIGHT	LOST

DIEBOLD 26897 (29507)

Fig. 2.—Treatment record. When recording for upper jaw, upper part of square is checked; when recording for lower jaw, lower part of square is checked.

When the appointment charge is in effect, its recording is not difficult as we use a treatment card for each patient on which every appointment and the service rendered is recorded (Fig. 2). Throughout the treatment this proves a valuable reference chart. The appointment date is simply added to the

financial card (Fig. 3). A competent secretary can do this each day with little effort.

Discussions at various times have led me to believe that certain professional men are able to obtain greater financial stability because they have a clear view of what is the return from their professional efforts. They do not suffer from a practice mirage with much work and little to show for it in the end. A

PATIENT:

SEND BILLS TO:

FEE

DUE	AMOUNT	PAID		DUE	AMOUNT	PAID

DIEBOLD 26896A (295L4)

A.

APPOINTMENTS

DATE	AMOUNT	PAID		DUE	AMOUNT	PAID

DIEBOLD 26896B (295L4)

B.

Fig. 3.—Financial record. *A*, First year, second year, etc. *B*, Opposite side of card for appointment charges.

review, therefore, of certain fundamentals may be useful. One basic fact is that few practices can be run for less than 33 ⅓ per cent of the gross as an overhead. Even though size of family and dependents may affect the total amount subject to taxation, no one can escape a federal income tax of at least 25 per cent of the net. Simple arithmetic on a fee basis of $600 for a two-year case indicates that overhead and taxes leave but $300 out of the $600 or but 50 per cent for the practitioner. From this, actually there are higher income taxes than stated, the surtax brackets adding to the tax load, and there are state and city income taxes and other inescapable charges which in the end leave from the $600 fee slightly more than $200 for two years or $100 a year, net, for the practitioner. If the flat fee basis exists and a case requires several additional years to complete, it is possible on what appears to be a fine initial business arrangement to find it net almost nothing. Hence, instead of having something for family expenses, insurance, and savings, the orthodontist is lucky to have enough cash in the bank to meet heavy quarterly tax payments when due. There is need for some change in the financial picture. We should close loopholes such as protracted cases which end up in being worth nothing net to us. We can do that by charging for definitely determinable services and providing that thereafter the patient pay for needed service as it arises in accordance with problems of the individual case.

Too many forms and letters to fill out may cause more effort than is worth while. The few I have shown have proved their worth and, while they may not appeal to you, they mean a great deal to me. There is one other which in its present form is a revision and seems to have advantages. All orthodontists are plagued with noncooperative patients, yet there comes a period when cemented appliances are no longer advisable. We often provide a removable plate as a support. Some of my most lovable and otherwise fine youngsters cause me no end of worry at this time. To lessen my responsibility, I send the following letter when retainers are inserted:

"The active or corrective period of treatment for ———— has been for all practical purposes completed and I have inserted in ———— mouth a removable retaining plate designed to hold the upper/lower teeth in their present favorable position. The plate can be lost or broken and must, therefore, be given care. It is to be worn day and night and should be kept clean. Night wearing alone is the general procedure after about ( ) months of day and night wearing. Continuance of the plate as a support is necessary if the result obtained is to be assured.

Additional treatment brought about by failure to cooperate in wearing the retention plate so that a relapse occurs will simply result in additional expense. This I would like to avoid and I am sure you would.

Appointments during the retention period are at rather long intervals, which places the responsibility for maintaining the present satisfactory condition of the teeth in the hands of the patient and the parent. If at any time the plate cannot be worn, you must promptly notify me so that an appointment may be arranged. Delay under such circumstances may result in relapse, with added treatment and expense.

Your cooperation will be appreciated."

When asked to prepare a paper for this meeting the subject was suggested to me. As originally written this paper developed into unreasonable lengths. So it has been reduced, even though certain problems that were eliminated are problems of everyday practice, and discussion of them would have made you think about them. This opportunity has been a most satisfactory one to me, for it provided a chance to review my office procedure with a critical eye, and from that I have benefited I hope all of you have.

831 Park Avenue

POPULAR CONCEPTIONS OF ORTHODONTICS

JACK W. LEACH, B.A., OKLAHOMA CITY, OKLA.

A DENTIST is in business whether he likes it or not. He has a bank account, employs people, pays rent, has a letterhead, business phone, typewriter, filing cabinet, desk, bookkeeping system.

And now that dentists are making surveys, they are becoming even more like businessmen. Dentists, and that certainly includes orthodontists, must, like the businessman, "know where they stand." The only satisfactory way to determine this is by survey.

Nowhere, I think, is this more keenly realized by professional men than by orthodontists. The unity of your Southwestern Society, supplemented in turn by close cooperation among the practitioners locally, makes for a teamwork that's bound to get results!

Nowhere, I think, will you find better proof of the statement I just made, than in Oklahoma City, where Dr. Harry Sorrels and his four colleagues, at the instigation of Dr. Curtis Williams, were instrumental in having made the survey we are to discuss today.

Yes, the survey is made. Its facts are there ready for your eyes—and ready for your action. Let's see how they shape up—what general conclusions we can draw—and what action we should contemplate.

Our survey was made in Oklahoma City proper by the Oklahoma Publishing Company. The Oklahoma Publishing Company owns and operates the *Daily Oklahoman* and the *Oklahoma City Times,* two of the largest and most up-to-date newspapers in the Southwest, besides several radio stations.

First, the survey was limited to families in Oklahoma City. Then it was limited to families in Oklahoma City who had children, since this group would probably have more information on orthodontics than families without children. So, the families finally chosen were taken from the Parent-Teacher Association. Careful selection of the names was made to be sure all residential areas were encompassed and the various income groups represented.

Three hundred letters were then sent to these parents. The letter itself was brief and explanatory. The survey questions, however, were on a separate sheet, completely filling an 8½- by 11-inch page. Nine questions, some of which were subdivided, covered the field as well as any nine questions could possibly do. The very fact that out of these three hundred letters we received nearly ninety replies is a testimonial to the job Oklahoma orthodontists have been doing.

Not only did our friends in the P.T.A. (and we must call them friends, since they took anywhere from fifteen minutes on to fill in our questionnaire)

Presented before the Southwestern Society of Orthodontists, Dallas, Texas, Feb. 5, 1947.

fill in our questionnaire, but almost half of them took the time to voice their own opinion on the members of your profession.

And right here is the time to make clear that whatever salient points the survey may have brought out, *those attitudes and opinions were brought about by the ACTIONS of the orthodontists.* Regardless of the opinions of the public, one thing is sure—you yourself are responsible for what they think about you.

Just what *do* they think of you, Doctor?

Well, over 80 per cent, eight out of ten of these people, knew that an orthodontist is a dentist who specializes in straightening teeth. And you must admit that is pretty good. At least they knew you weren't an exodontist, a prosthodontist, or a periodontist!

In our second question on the survey, we really got down to brass tacks. We asked, "Has any member of your family ever had teeth straightened?" There was no mention of fee, no mention of pain, just a sample question. Once more you scored comparatively high. Thirty-two per cent said members of their family had had their teeth straightened. Only one family answered, "They did not know whether they had or not."

It would be easy to imagine just how pleased orthodontists *would* be if this figure were true on a national basis. That would mean three out of every nine families would have or had had some member of the family under your treatment. Well, anyhow, it's something to work for in the future.

The next question on our survey followed in logical sequence and along the same line. "Have you ever known anyone who has had teeth straightened?" On this question, you not only scored high—you rang the bell. Over 88 per cent of those people who answered our survey said they did. Yes, they knew someone who had had his teeth straightened.

But just a minute before you start bragging about this answer. Remember, more than 10 per cent of them had neither friends nor members of their families who had ever been to an orthodontist. Some of these respondents who answered that they did know someone who had had teeth straightened didn't know these people *well enough* to know at what age the visit to the orthodontist had taken place. Fifteen per cent of these people wouldn't even guess at the approximate age of the patient. Certainly, then, this was no Damon and Pythias friendship. On the contrary, part of this information must be judged as hearsay from mutual acquaintances.

There is, however, a brighter side to the picture. To compensate for the uncertainty of these folks, take a look at the fourth question. It was, "If you know anyone who had had teeth straightened, at what age was this undertaken?" We had seven categories or age brackets listed. It is significant to note that over half of those answering (and this is a parent-teacher group) said this treatment had occurred between the ages of 10 and 12 years.

At this point, we must leave the survey in order to tie in some of the orthodontist's thinking, both in his own behalf and that of the patient.

There is, undoubtedly, a time in the patient's life when the orthodontist's goal can be gained, that is, a maximum result in the minimum time. For,

after all, time is far more precious to an orthodontist than to a Swiss watchmaker.

Catching the patient at this time in his dental life means his service from the orthodontist costs *HIM* less and takes less time. It takes *YOU* less time and you make *more* money! In addition to this very practical situation, intangible results of great benefit to the profession are achieved. The interest of the patient is maintained because results are more quickly obtained. Interest of the parents is maintained because payments are more quickly terminated.

Strictly from a professional standpoint, that period of early treatment expediency—a maximum result and minimum time period—usually, I am told, comes between the ages of 10 and 15.

How many of our friends in the survey fall in this pleasing classification? Congratulations, doctor—the figure is: 76 per cent of them are being treated during the period of maximum result and minimum time.

If we are to take this figure as a yardstick for the rest of your society, you can take time out for a quick pat on the back before you rectify some of the other facts the survey brought you for your inspection.

The fourth question on our survey was, "If the work is now finished, how long did it continue?" In the first place, more than half of our respondents refused to answer that question. But, on the other hand, over half of those who did answer (and these must have been prize patients) said the treatment had continued from one year to three years. There, again, is your maximum efficiency theory working out in practice.

Part "b" of the fourth question also offers room for considerable discussion. "If it is still in progress, how long has it been going on?" This time, 70 per cent refused to answer the question. A logical increase—since some of them answered part "a" of the question.

For those who did answer, the median time spent for treatment was two years. *But 12 per cent of those answering said the treatment had been going on for six years or more.* The point needs no comment from a layman or professional man either.

The next part of question "4" brought up the bugaboo of pain—archenemy of the dental profession. Just a simple little question, "Were the appliances in any way painful?" Before I tell how our respondents answered, I would like to say they must have been honest because, even though 45 per cent of them refused to answer the question, they didn't go ahead and answer "yes," though, to say the least they probably had a sneaking idea the appliances *were* somewhat painful, since practically all dental operations are somewhat annoying if really not painful.

However, the important fact is that, of the 55 per cent who answered the question, each stated unequivocally there was no pain. This proves, *when it comes to pain, pride in the result will overcome all else.* "Annoying?" Why, yes, said 80 per cent of those answering. But painful, why just let me *smile* for you one time!

At the beginning of this paper, I told you, and I think you agree it's true that whatever this survey stood for, meant, or brought out, you were responsible for it. Well, at this point, you can unbutton your vests and get ready to beam!

Our question was "Have the results been satisfactory?"

Our answer was "Yes" from 98 per cent of our respondents.

And only nineteen failed to answer the question. Please keep this fact in mind because it is important to every other question in the survey! It shows more clearly than any statement you could make that you have done a good job. It is proof of the pudding. *When you did a job, you did it well.* When viewing the *results,* pain was forgotten. Gone was the memory of the bill, the annoyance of the appliance.

But remember this—you had to get those people *in your office* to sell them. You had to do the job in order to convince them it was really worth while.

Ninety-six per cent of the parents who footed the bills thought the charges were reasonable for the service they received. Maximum efficiency paid off again. Only 35 per cent failed to answer this question and we can logically assume that part of this number actually had no conception of the price one would have to pay for orthodontic service.

It might be well, too, to remember, that many children come to orthodontists because of their parents. As a rule, children are not interested in health because they have it. They're only interested in health as it affects their relationship with Bill, or Johnny, or Dick. And sometimes malocclusion can do just that, but, more probably, with Mary, Joan, or, Dolores.

The fact remains, however, that parents with an orthodontic problem themselves which was never corrected are most active in obtaining for their children that which *they* never received.

To these parents, who have known the chagrin and embarrassment of protruding teeth, disfigured profile, and being different from other people, no charge is too high, no bill too large to prevent that same thing happening to their children.

No wonder then that 96 per cent of these parents were satisfied with the time required for correction. No wonder more than 75 per cent thought the charges were satisfactory.

Mind you, that is not the whole picture on these particular replies. But certainly it is significant enough to those of you who have constantly encountered these problems in your offices day after day.

The next question in our survey took a wholly different aspect of the entire orthodontic problem because it was general and not specific. "Do you believe all people that need it should have their teeth straightened?" One person failed to answer. Two people said, *"No." Ninety-seven per cent said, "Yes, I believe all people who need it should have their teeth straightened."*

Now, gentlemen, as an advertising man, there is a point. There is the answer to pain. There is the answer to the present "price" of orthodontic treatment.

It's commonsense to do away with the "poor Miriam's." Everyone wants a flashing smile and pearly white, even teeth.

The question then is, "What do you think is the chief reason more people don't have this work done?" Your patients answered it this way. Sixty per cent of them think you charge too much. Yes, in spite of the fact that 97 per cent think all people who need it should have their teeth straightened, in spite of the fact that 77 per cent think their own charges satisfactory, in spite of the fact that 96 per cent think the time taken for straightening teeth was well spent—*60 per cent of your patients think you CHARGE THE OTHER FELLOW TOO MUCH MONEY.*

They think *that* is the chief reason more people won't go to an orthodontist. More than 17 per cent of your own patients think the reason *is not because the bill is too high but because there is a lack of information about your services.* Even though the percentage is lower, this is probably the answer to the whole problem.

I say it is the answer in spite of the fact that eight out of ten of those people answering our survey state flatly they think teeth-straightening is expensive. Sure, I think an automobile is expensive, too! But I drive one! I think a wife is expensive, but I expect to have one! I think a symphony is expensive, but I attend! It isn't the *cost* that deters the vast bulk of the people from visiting your office. No, rather, *it is a lack of information* on the value of the service you can render.

That service, as you and I well know, is one of tremendous and lasting value. During the war, we sold bonds by the thousand because we said, "They grow in value every year—pay four dollars for three." Ask any person who ever had crooked teeth, and he'll tell you the service of the orthodontist meant as much to his happiness as any other single item. Too high? No, *too little* realization of the importance of the service which could be rendered.

Proof of what I just said is in the answer to the next question on our survey, "Do you, yourself, recommend this treatment to friends?" More than *nine out of ten do!*

And, furthermore, they think *you* should, too! More than eight out of ten think so! Eighty-two per cent believe the dental profession should educate people through group advertising about the possibility of straightening teeth!

Here are the very words of some of your patients:

"I think the people should be educated in some way, either through group advertising, or through talks before the various civic groups and P.T.A.'s."

Said another, "I think it is due to lack of education that many do not have their teeth straightened."

Said one, "I feel that parents should be taught anything that will help their children."

Another, "Definitely! The people are not properly informed about orthodontics."

But this one takes the cake. "Has appearance of a racket. Ninety per cent of cases needing correction prohibited by cost. At the rate of $100 in advance and $20 per month, the cost is $14 per average fifteen-minute visit, which is high even for highly specialized talent and entirely out of reach of average parents' income."

No, gentlemen, the man who wrote that statement didn't think *he* was wrong—he knew *YOU* were! That's the reason he felt bitter about the cost. Somewhere along the line, somebody slipped.

But that in itself is not a crime. After all, the orthodontist's hands have been full during these war years. His prices alone have not been "adjusted," even though his living costs, office costs, and so on advanced just as fast as everyone else's.

Yes, every business makes its mistakes. Everyone knows that. But the orthodontists of Oklahoma are going a step farther to keep from making more. This survey proves that. That is the most important fact of the survey itself. The very fact that it *was* made is an indication that orthodontists want to see their problems in black and white.

But surveys alone are not enough. A survey that results in no intelligent action is as worthless as a confederate dollar. Facts that are invaluable to your profession are contained in this survey. It is a good start. But it is only that —a good start.

To break the tape at the finish line, I strongly urge that the material in this survey be turned over to your Public Relations Committee for constructive action and recommendations. They are familiar with other projects of this type in their field. They have the "know-how" to follow through with definite, concrete action.

Whether or not this survey comes to be worth more than the paper it is written upon is up to you. It provides a formidable challenge which you must accept.

And when you do accept it, the whole dental profession and the American people will benefit. Rich rewards can come only from rich service.

A Study Conducted for the Southwestern Society of Orthodontists*

PREFACE

Since it is a prima-facie conclusion that orthodontics is essentially a children's specialty, it was assumed that limitation of investigation through a group composed of parents would yield maximum information. If the group could be confined to include parents of children of school age, this further limitation appeared advisable.

The parent-teacher association obviously constituted such a qualified group and this study was accordingly designed to reach a selected, cross-sectioned membership of that organization.

Questionnaires were sent to a qualified list of 300 members and at the time of tabulation, 26.7 per cent had replied.† Since these replies reflect an adequate cross section of Oklahoma City geographically and economically, it is believed that the percentages derived from data obtained may, in safety, be applied to the total market.

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*Published By The Oklahoma Publishing Company, Oklahoma City, Dec. 10, 1946.

†Since the time of tabulation, sixteen additional letters have been returned, with essentially the same replies.

RESPONDENTS REACHED BY MAIL WITH QUESTIONNAIRE

November 20, 1946

Dear P.T.A. Member:

The dentists of Oklahoma are anxious to gather some information that will assist them in rendering better service to your children.

Because we believe, as I know you do, that children's health is a matter of interest to every parent, we have agreed to collect the information desired.

We are enclosing a short questionnaire (which, for the most part, can be answered merely "yes" or "no"), together with a self-addressed envelope for its return. If you will take a minute or two to complete it, at once, you would greatly assist the program.

Your name will, of course, not be used in reporting the information, but a summary of the replies received from the several hundred parents to whom this letter is being sent will be made available to all members of the dental profession in Oklahoma.

Please accept our thanks for your cooperation.

Sincerely yours,
THE OKLAHOMA PUBLISHING COMPANY
DAVID F. WOLFE, RESEARCH DIRECTOR

Child Dental Health Study

1. Do you know which of the following terms denotes a dentist who specializes in straightening teeth? (Please indicate by checking.)
   Exodontist ☐ Orthodontist ☐ Prosthodontist ☐ Periodontist ☐
2. Has any member of your family ever had teeth straightened? Yes ☐ No ☐
3. Have you ever known anyone who has had his or her teeth straightened? Yes ☐ No ☐
4. If you know anyone who has had teeth straightened, at what age was this work undertaken? _____ years.
   a. If the work is now finished, how long did it continue? _____Or, if it is still in progress, how long has it been going on? _____
   b. Were the appliances in any way painful? Yes No Annoying? Yes ☐ No ☐
   c. Have the results been satisfactory? Yes ☐ No ☐
   d. Are the parents satisfied with the time required for the correction? Yes ☐ No ☐
   e. Were the charges satisfactory? Yes ☐ No ☐
5. Do you believe all people who need it should have their teeth straightened?
   Yes ☐ No ☐
6. What do you think is the chief reason more people don't have this work done?
   Fear ☐ Cost ☐ Other _____

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7. Do you, yourself, consider teeth straightening expensive? Yes ☐ No ☐
8. Do you, yourself, recommend this treatment to friends? Yes ☐ No ☐
9. Do you think the dental profession should educate people through group advertising about the possibility of straightening teeth?

Remarks _____

Name _____ Address _____

NOTE: YOUR NAME WILL NOT BE USED! IF YOU PREFER NOT TO SIGN IT, YOUR REPLY WILL BE JUST AS VALUABLE.

1. Do you know which of the following denotes a dentist who specializes in straightening teeth? (Please indicate by checking.)

	NUMBER	PER CENT
Exodontist	2	2.5
Orthodontist	66	82.5
Prosthodontist		
Periodontist		
No answer	12	15.0
TOTAL	80	100.0

2. Has any member of your family ever had teeth straightened?

	NUMBER	PER CENT
Yes	26	32.5
No	53	66.2
No answer	1	1.3
TOTAL	80	100.0

3. Have you ever known anyone who has had teeth straightened?

	NUMBER	PER CENT
Yes	71	88.8
No	8	10.0
No answer	1	1.2
TOTAL	80	100.0

4. If you know anyone who has had teeth straightened, at what age was this work undertaken?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
7-9 years	5	6.0	7.1
10-11 years	17	20.5	24.3
12 years	25	30.2	35.7
13-14 years	12	14.4	17.1
15-20 years	5	6.0	7.1
21-25 years	2	2.4	2.9
26-30 years	3	3.6	4.3
42 years	1	1.2	1.5
Don't know—no answer	13	15.7	
TOTAL	83*	100.0	100.0
MEDIAN, 12 years			

4a. If the work is now finished, how long did it continue?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
3 months	1	1.3	2.9
6 months	1	1.3	2.9
9 months	1	1.3	2.9
1 year	7	8.7	20.0
1½ years	3	3.7	8.5
2 years	9	11.2	25.7
2½ years	1	1.3	2.9
3 years	4	5.0	11.4
4 years	3	3.7	8.5
5 years	1	1.3	2.9
6-7 years	3	3.7	8.5
8 years	1	1.3	2.9
Don't know—no answer	45	56.2	
TOTAL	80	100.0	100.0
MEDIAN, 2 years			

If it is still in progress, how long has it been going on?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
6 months or less	4	5.0	16.7
1 year	5	6.3	20.8
1½ years	1	1.3	4.2
2 years	7	8.7	29.1
2½ years	1	1.3	4.2
3 years	3	3.7	12.5
6 years	3	3.7	12.5
Don't know—no answer	56	70.0	
TOTAL	80	100.0	100.0
MEDIAN, 2 years			

*Three respondents stated two ages at which work was undertaken.

4b. Were the appliances in any way painful?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	11	13.8	25.0
No	33	41.2	75.0
Don't know—no answer	36	45.0	
TOTAL	80	100.0	100.0
ANNOYING?			
Yes	42	52.5	80.8
No	10	12.5	19.2
Don't know—no answer	28	35.0	
TOTAL	80	100.0	100.0

4c. Have the results been satisfactory?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	60	75.0	98.3
No	1	1.3	1.7
Don't know—no answer	19	23.7	
TOTAL	80	100.0	100.0

4d. Are the parents satisfied with time required for correction?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	50	62.5	96.2
No	2	2.5	3.8
Don't know—no answer	28	35.0	
TOTAL	80	100.0	100.0

4e. Were the charges satisfactory?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	42	52.5	77.8
No	12	15.0	22.2
Don't know—no answer	26	32.5	
TOTAL	80	100.0	100.0

5. Do you believe all people that need it should have their teeth straightened?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	77	96.2	97.5
No	2	2.5	2.5
Don't know—no answer	1	1.3	
TOTAL	80	100.0	100.0

6. What do you think is the chief reason more people don't have this work done?

	NUMBER	PER CENT
Fear	7	5.9
Cost	71	60.2
Other		
Lack of information	21	17.8
Negligence	9	7.6
Annoying appearance of braces	3	2.5
Doubt of success	2	1.8
Length of treatment	2	1.8
Belief that teeth will straighten naturally	1	.8
Unsatisfactory results	1	.8
Unsatisfactory orthodontist	1	.8
TOTAL	118*	100.0

*Excess of replies was caused by multiple answers to this question.

7. Do you, yourself, consider teeth straightening expensive?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	61	76.2	82.4
No	13	16.3	17.6
Don't know—no answer	6	7.5	
TOTAL	80	100.0	100.0

8. Do you, yourself, recommend this treatment to friends?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	68	85.0	98.5
No	1	1.3	1.5
Don't know—no answer	11	13.7	
TOTAL	80	100.0	100.0

9. Do you think the dental profession should educate people through group advertising about the possibility of straightening teeth?

	NUMBER	PER CENT OF TOTAL REPLIES	PER CENT OF DEFINITE REPLIES
Yes	65	81.2	82.3
No	14	17.5	17.7
Don't know—no answer	1	1.3	
TOTAL	80	100.0	100.0

FREE COMMENT

While most of the questions could have been answered by merely checking "yes" or "no," it is interesting to note that 43.8 per cent of respondents took the trouble to voice free comments. Perhaps no more significant clue is contained in any other section of the questionnaire to the genuine interest of parents in orthodontics than in these verbatim transcripts:

Worth time, effort and money to have corrections. Pretty teeth make a person, ugly ones ruin appearance.

I think it is due to lack of education that many do not have their children's teeth straightened.

If the cost were lower it might pay to advertise, otherwise only those financially able will take advantage.

I do think it means a great deal to children if very uneven teeth are not straightened. Many parents are afraid it will give their children a complex.

I think the public generally knows too little and many people feel they cannot afford to have the work done.

Many persons' entire lives may be changed by improving their looks by straightening teeth.

I think more people should know of this service. Perhaps then the cost would not be prohibitive.

Not if it is added to the customer's expense. It is hard for most parents to pay so much for so long.

While expensive, I feel that orthodontics should be made available to children of all means, if possible.

Cutting cost would make it possible for more people to have it done.

The prices quoted to people I know have been from $100 to $500 to straighten children's teeth. People with modest incomes can't afford to spend that much unless it is a dire necessity.

Am of the opinion that if this service could be made at a lower cost many more would have it done.

I think the people should be educated in some way. Either through group advertising or through talks before the various civic groups and P.T.A.'s.

I think crooked teeth are one of the main causes of inferiorty complexes in children and adults as well.

I feel that parents should be taught anything that will help their children.

Definitely. The people are not properly informed about orthodontics.

There is no doubt, for reasons of health and self-confidence, that crooked teeth should always be corrected.

One of my children needed his teeth straightened and the dentist did not recommend it because we are in moderate circumstances and he knew it and seemed to think it was too expensive for what was gained.

Has appearance of a racket. Ninety per cent of cases needing correction prohibited by cost. At the rate of $100 in advance and $20 per month, the cost is $14 per average fifteen-minute visit which is high even for highly specialized talent and entirely out of reach of average parents' income.

A very worth-while thing as one's looks often affect his outlook on life.

It is new and people do not realize what can be done.

Advertise through the schools; a wider use should cut down prices.

Make it possible for average income families. Because of cost my own child had the work done through Crippled Children's Hospital.

The school dentist should send information home to parents concerning what that child needs, giving facts of why, when, and an idea of the cost.

The results are worth every effort and all the time spent.

If they would get their prices down where people in the limited income bracket could afford it.

More men in this field should make this service available to so many sadly in need of it.

Benefits should be shown to children, through the use of movies on slides at school and parents at P.T.A.

If necessary in your own family, facts about orthodontics would be valuable information.

Among the average class of people the cost is out of the question.

Looks alone would mean a great deal to most people.

People should be educated about the necessity of straightening teeth but I wouldn't say that advertising would be the best method.

212 South Twenty-fourth Street.

DISCUSSION

Curtis W. Williams, Shreveport, Louisiana.—I want to express my appreciation to Mr. Leach for making this survey and coming down to Dallas and presenting it to the Southwestern Society of Orthodontists. I know he has gone to much trouble in getting out the questionnaires, having them returned, then making a summary and reporting the conclusions to us.

Although I believe the orthodontists in Oklahoma City are above the average, I am sure the survey made in Oklahoma City would apply to almost every city in the United States.

I believe this is the first time we have had an essayist to present a paper on this subject. At most of the meetings I have attended in the past, the essayist gets up and shows us how he made a beautiful correction with *his appliance*, but he never does mention his failures.

For a number of years I have been interested in knowing what the general public thought about orthodontics and what their reaction was to having treatment started. After the treatment was completed, I often wondered if the majority of the parents and patients were satisfied with the results.

After reading Mr. Leach's questionnaire, answers, and comments, it gave me some idea of the reaction people have to our work.

I think this paper given by Mr. Leach is a good presentation of the subject, the greatest objection being that not enough people were contacted, or those who received the questionnaire were not interested enough to fill it out and return. You will remember three hundred questionnaires were mailed out and only eighty one or 26.7 per cent were returned; to me this was a very small percentage. I would like to know what the other two hundred nineteen thought of our specialty.

Mr. Leach has very ably covered the questions and answers. To sum up his remarks, our problem seems to be a question of cost first, education second.

I cannot help but feel that if the public were educated the cost would be secondary.

There is a certain class of people in every city or community who think they get robbed on everything they buy. Butter is too high, bacon costs too much, or most all necessities are too expensive. They like to brag about how much money they have to spend. These people complain about orthodontic treatment being expensive. These same people will spend as much as one hundred dollars for a case of liquor for a week-end party.

The public will spend money for what they want to spend it and it is up to us to make them want to spend it for orthodontics.

How much is orthodontic treatment worth?

Any amount of money we charge some people is too much, whether it be $5.00 a month or $20. I do not believe you can give orthodontic treatment away. People have to pay something for our services or they become disinterested and eventually discontinue keeping their appointments.

In the community where I live, the most desirable patients come from the low-income group. They keep their appointments and pay their bills on time. They are very appreciative of what you accomplish and do not think the fee charged is too high.

How are we going to educate the public to the importance of orthodontics and dentistry as a whole?

I am going to offer a plan to our Public Relations Committee.

When it comes to educating the public, I do not believe it can be done by the orthodontist or the general practitioner of dentistry, but that we should try to get some outside lecturer familiar with our work, such as we have in the state of Louisiana, who is carrying on the extension work for the University. I believe it would help to solve our problem. This person, being connected with the university and not with dentistry, would certainly get the attention of the public.

When orthodontists go before the P.T.A. or other groups for educational purposes, the first thought seems to be advertising, and I think our efforts are in vain.

Another one of our problems comes from the man doing general dentistry. We need a better understanding and cooperation between us.

One of the comments of Mr. Leach's questionnaire was a very familiar quotation. Here is the comment:

"One of my children needed his teeth straightened and the dentist did not recommend it because we are of moderate circumstances and he knew it, and seemed to think it was too expensive for what was gained."

The dentist might have been correct, but why didn't he refer the patient to the orthodontist for advice?

Could it have been because he did not have confidence in the orthodontist?

What can we do to improve our relations with the general practitioner of dentistry?

THE GUIDE PLANE AS AN AID TO LABIOLINGUAL TECHNIQUE

BOYD W. TARPLEY, B.H., D.D.S., BIRMINGHAM, ALA.

IT IS a real pleasure to address such a group of eminent orthodontists as is assembled here today. I did not come to this meeting in a spirit of rivalry but with a sincere desire to know more about our profession. In discussing this subject, I do not intend to make any dogmatic statements but shall try to express a point of view that I hope will prove helpful. Most of the ideas set forth in this paper are not exclusively my own, but are drawn from that practical experience of others which forms a part of the background of all scientific progress. The general concept of "Normal" today in medicine is not the perfection of shape, size, or form of any individual organ, but, rather, the harmonious functioning of all the organs. This seems to me the logical approach to our problem of a normal mouth. In the labiolingual technique we are striving not only to give our patient a pleasing appearance but are also striving for harmonious functioning of all the teeth even though each individual tooth may not be in perfect alignment. Mershon has often said that a well-balanced face is far more important than an exact tooth alignment.

Our dental dictionaries define an inclined plane as "some form of plate which the mandibular incisors forcefully engage in closure." Let us keep this definition in mind as we differentiate between these inclined planes and the occlusal guide plane as advocated by Oliver. In approaching this subject, I would like to review a few of the so-called inclined planes that have been used and are in use today. The first mention of this appliance that I was able to find was made by Duval and Fox, and later by Delabarre, who described it as "a small die, which, placed over the tooth that has deviated to the exterior, is disposed of in such a way as to strike at every occlusal of the mouth." It seems that the earliest inclined planes were used only to release the lingual lock of the maxillary anteriors. Later, Talma mentioned the same appliance to correct a lingual lock of the maxillary teeth. Kingsley seems to have been the first to use the inclined plane on the maxilla to change the anterior-posterior relation of the jaws, and was inseparably associated with "jumping of the bite." In his chief method of treatment he used vulcanite along with ligatures, jackscrews, bite plates, and chin cap. He also seems to have been the first to use the inclined plane on Class II or distoclusion cases. From Kingsley on up to Hawley, various types of materials were employed in constructing the planes. Again, let us remember that in every case of the plane mentioned, the incisors are forcefully engaged in closure. In our slides, we have diagrams showing how these planes were contacted by the incisors. There was no definite depth or pitch to these

Read at the meeting of the Pacific Coast Society of Orthodontists, San Francisco, Calif., Feb. 27, 1947.

planes, and the patient could have many bites. Kingsley first used this inclined plane as a primary treatment appliance, but later discontinued its use except for retention. I believe he discontinued its use because he could not lock the premolars and molars with this inclined plane, since it permitted the teeth to have many positions of closure instead of limiting them to one.

In our review of the evolution of inclined planes, we have now reached the occlusal guide plane which is so designated because it has a definite purpose in treatment. The word "occlusal" suggests the occlusal surface of the teeth; the word "guide" refers to an agent which exercises a regulating or directing influence when in use; the word "plane" we associate with a surface, inclined or flat. As defined by Oliver, Irish, and Wood in their textbook, *Labio-Lingual Technic,* the occlusal guide plane is a mechanical device having an established inclined plane which, when in use, causes a change in the occlusal relation of the maxillary and mandibular teeth and permits their movement to a normal position. While the occlusal guide plane is probably the most often misunderstood and misused of all lingual appliances, it does have a definite place in the practice of orthodontics, but, before the desired results can be obtained, it is imperative that the operator understand clearly its use and construction. While this construction is not difficult, satisfactory results depend on accuracy in fabrication. The occlusal guide plane cannot be brought from any manufacturer, but must be constructed for each individual case. Not long ago, some manufacturers brought out a type of metal inclined plane that was attached to the maxillary appliance. These had no definite depth or pitch, and their only advantage over the vulcanite inclined plane was in cleanliness and strength. Some orthodontists tried these out thinking they were occlusal guide planes, and were disappointed in the results. As you know, these planes were not occlusal guide planes at all. The occlusal guide plane is a primary treatment appliance which is constructed simply and needs very little adjustment. It can be used on deciduous, mixed, or permanent dentition with the adjustment periods easily spaced at four to five weeks. Long ago Martin Dewey said that simplicity makes surety, and this still holds true today.

The purpose of the occlusal guide plane is to obtain a change in the structural relation of the oral cavity and to aid in the establishment of a correct anterior-posterior relation of the teeth and arches. We know that the occlusal guide plane is a fixed removable appliance which has a decided advantage over the ordinary type in that the patient cannot put it in or take it out at will. It is constructed on the maxillary lingual appliance so that the mandibular incisors do not engage it forcefully, but are guided anteriorly to the plane when the jaws are brought together. The occlusal guide plane should rest on the lower lingual appliance or be slightly anterior to it and touch the lower lingual appliance from cuspid to cuspid when the teeth are in occlusion. In most cases where bite opening is indicated, the molars and premolars will be out of occlusion when the appliance is first placed on the teeth, but in other cases where opening is not desired but only a forward movement of the mandible, they may occlude slightly. When constructing the occlusal guide plane, the relation of the mandible and maxilla is set to a determined position permitting the premolars

and molars to meet in what is known as normal occlusion. Of course, auxiliaries can be attached to the labial appliance to stimulate mechanically the movement of the individual teeth into their positions. One of the greatest advantages of the occlusal guide plane is that it permits freedom in tooth movement and does not load the teeth with bands. Mershon has said that any appliance or procedure that limits the slight movement which is natural with teeth impairs the tooth function. In changing the anterior-posterior relation of the mandible and maxilla, we also change the incisal relation. The pitch or variance from perpendicular of this auxiliary is determined primarily by the change of anterior-posterior relation of the arches, and, secondarily, by the amount of occlusal separation between the maxillary lingual appliance and the mandibular lingual appliance. The incline of the plane is not made in a hit-or-miss fashion, but is built to precision. It may have a slight forward or backward inclination to conform to the individual case. The depth of the plane will vary with each individual case, and will be governed by the pitch and amount of space between the maxillary lingual appliance and a position where it will strike the mandibular lingual appliance very gently in a slightly anterior position. In some cases, it might even touch the cuspids or lower anteriors slightly at the gingival margin. By changing the incisal as well as the occlusal relation, Nature is free to let the teeth move into their respective positions. If the appliance is constructed properly, the patient cannot bite posterior to the occlusal guide plane, but will be guided to only one point of rest when the teeth are in full occlusal position. The occlusal guide plane must be constructed on a maxillary lingual that will not form a pointed but a squared curve at the cuspids. This should not be overdone, but if you will note in Oliver, Irish, and Wood's book, the linguals are so constructed. This is why many fail, and why the plane digs into the tissue. The lingual appliance should contact the premolars as much as possible. I do not intend to go into detail on its construction at this time as this is adequately covered in the aforementioned book. As I see it, the greatest difference between the usual inclined planes and the occlusal guide plane is that the occlusal guide plane is a precision appliance built for a definite purpose and having only one point of rest when the teeth are in occlusion. On the other hand, the usual inclined plane is made only to hold the posterior teeth out of occlusion, and the patient may bite posterior to, on, or anterior to this plane. The occlusal guide plane is an initial or primary treatment appliance; the inclined planes are used as a secondary or retaining appliance.

In order to use an appliance efficiently, we not only have to be able to construct it properly, but also to know when it is indicated or contraindicated. Important as the appliance may be in successful treatment, the judgment and experience of the operator is much more important, for his correct selection and proper use of the appliance employed in a specific case are the determining factors. I am sure all of us wish we had the experience and diagnostic skill of such men as Angle, Dewey, Broadbent, Hellman, Mershon, Lourie, Tweed, Oliver, and other eminent men in our profession. If we could only start out in practice with their skill and experience, we could rise to new successes in treatment as we grow older.

Since the chief aim of the occlusal guide plane is to correct the anterior-posterior relation of the teeth and arches and the occlusal and incisal planes, one of its most satisfactory uses will be found in the treatment of bilateral distoclusion cases or Class II, Division 1 type of malocclusion. This type of case, as you will remember, presents a bilateral distoclusion relation of the lower arch, protrusion of the maxillary anterior teeth, narrow maxillary arch, undersized mandible, abnormal muscle pressure, and abnormal atmospheric pressure with mouth breathing. In order to treat this type of case more successfully than is possible with the plain labiolingual appliance, Oliver was led to perfect the occlusal guide plane. If you feel that a forward positioning of the mandible is desirable in this type of case, then the occlusal guide plane should be used. It is a most efficient appliance for this procedure. When using intermaxillary rubber bands in conjunction with the labiolingual appliance only, interference will still be present. However, with the use of the occlusal guide plane, the intercuspal lock is removed and the intermaxillary rubber bands start to work from the point where the guide sets the jaw relation instead of first having to unlock the cuspal relation. This greatly speeds up the treatment of the case and cuts down trauma. At the same time that this forward movement of the mandible is taking place, the bite is opened and the mandibular premolars can move labially with ease, falling into their proper relation with the maxillary premolars. You will note that as the mandible is moved forward, little expansion is necessary in the molar region. With this immediate forward positioning of the mandible and upward pull, the forward force of the intermaxillary rubber bands is reduced and is soon practically unnoticed by the patient. Let me make this point clear: The occlusal guide plane is not a universal appliance, but must be used for specific treatment of cases where forward positioning of the mandible is desired. When used in distoclusion cases where this is indicated, it brings about a definite positioning of the mandible by the carefully determined and constructed angle and depth of the guide plane. Later, when the plane is removed, the patient still cannot return to the original bite, because the premolars have so arranged themselves that the patient finds any position of occlusion but the correct one uncomfortable. Therefore, I believe this movement is positive. In some extreme instances where the mandible should come forward, the case must be treated in steps. If the mandible is set too far forward, the patient can bite posterior to the guide, thus defeating the purpose of the plane, and it is therefore constructed to move the mandible forward only part of the desired position. The patient wears this guide for a period of time until the teeth are well in occlusion at this position and show a definite change. Then a new guide is constructed and the mandible is moved forward a little more nearly to the desired position. In some cases, as many as three or four guides may have to be constructed before reaching this desired position. From my experience, there seems to be little doubt that a posterior movement of the maxillary molars is taking place during this process of mandibular movement.

Another instance in which the occlusal guide plane is indicated is Type II, Division 2, or cases having a bilateral distoclusion with usually a retrusion of the

upper anteriors. If we desire a forward movement of the mandible, we will first have to correct the retrusion of the anteriors or partially do so before constructing the guide plane and setting the mandible forward. If the retrusion of the maxillary anteriors is not too great, the guide plane can be used at the beginning of treatment with extensions added to the maxillary lingual arch which will rest on the lingual of the anterior teeth and force them forward with a depressing movement when the teeth are placed in occlusion. This can be accomplished at the same time we are correcting the bite and allowing the molars to lock.

There is some disagreement about the use of the guide plane in unilateral distoclusion cases. In setting one side forward and not the other, the one compensates the other, and, if the case is selected carefully, it is successful. The guide plane should not be used if there has been an anterior drift of the maxillary teeth on the side that is malrelated.

When posterior movement of the maxillary molars and, also, unlocking of the cusps are indicated, the process is made much easier by the use of the guide plane. U bends are made in the lingual of the maxillary appliance and are opened as the molars move back. This posterior movement of the maxillary molars is accomplished with coil springs on the labial appliance and intermaxillary rubber bands. The guide plane will unlock the cusps and permit easier posterior movement of the molars and premolars. It also prevents the molars from tipping posteriorly as is so often the case when no lingual appliance is used. If the molars tend to tip posteriorly despite this protection, the contact of the guide with the mandibular lingual will rectify this movement.

The occlusal guide plane may be used in neutroclusion cases when the maxillary premolars are buccal to the mandibular premolars. Here the bite is arbitrarily opened, but no forward movement is desired. The mandibular lingual appliance with the use of auxiliary springs moves the maxillary premolars buccally; the maxillary labial appliance with auxiliary springs moves the maxillary premolars lingually. The movement of unlocking the premolars is accomplished with greater ease when the guide plane is used in this type of case and no intermaxillary rubber bands are necessary. The occlusal guide plane is quite efficient in breaking thumb and tongue habits, but I would not say that it was a specific, as other attachments could be used that are just as successful.

In constructing the occlusal guide plane, we must first decide what we want it to accomplish and then make it accordingly. It cannot be constructed by guess, but must be made precisely and accurately to obtain the desired results. Accuracy in fabrication must be emphasized throughout, from the fit of the molar bands to the lingual appliance which is the foundation of the guide plane.

As well as indications for the guide plane, there are certainly contraindications. One instance where this appliance is definitely not indicated is, of course, in mesioclusion or Class III cases or in open-bite cases. It is contraindicated when there is a mesial drifting of the maxillary teeth with a tendency toward open-bite. Here diagnosis enters the picture, and I am sorry that time does not permit my going into that subject.

In summarizing what I have said, let me make it clear that no one who understands the use of the occlusal guide plane will claim that it will treat all cases effectively, but that the arguments for its use in the types of malocclusion specified are both sound and strong. We must always keep in mind that this is primarily an appliance for forward movement of the mandible. The orthodontist who thoroughly understands its use will champion the occlusal guide plane because it successfully accomplishes certain objectives. Its greatest advantage lies in the immediate changing of the bite, which allows the intermaxillary rubber bands to go to work from a set point, thus cutting down on treatment time. Next in importance I would list its accomplishment in opening the bite which permits vertical growth and unlocking of the cusps in the molar and premolar areas. By placing the arches in normal position immediately, the patient is given the benefit of normal muscular action and gains more room for the tongues and passages of air. The guide plane fixes the bite at a definite place rather than allow the patient to bite behind, on, or anterior to the appliance as can be done with other inclined planes. It immediately changes the profile to a pleasing one, thus encouraging the patient to wholehearted future cooperation, a state which is so necessary with whatever appliance used. It is simple though sturdy in design, and is easily removed, adjusted, and replaced by the operator. It is a most flexible appliance in that it can be used on deciduous, mixed, or permanent dentition. It balances the anterior-posterior relation of the jaws as well as the incisal relation, an objective which must be accomplished if functional retention is to be realized and maintained. The bite is opened, reducing the likelihood of relapse caused by the mandibular incisors striking the lingual of the maxillary incisors forcefully. In closing, let me repeat most emphatically that the occlusal guide plane is not a panacea for all types of malocclusion, but that when used under the aforementioned conditions it has proved itself an extremely valuable adjunct to the labiolingual technique.

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ORTHODONTISTS IN THE UNITED STATES

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WITHIN recent years, the desirability of measuring the total size and nature of the dental problem in the United States population has become increasingly apparent. Because of several researches in this direction, sufficient data have been made available to provide tangible comprehension of the problem. These data include, among other information, estimates of the total need for dental service,[1] the yearly incidence of need for service among children and among adults,[2, 3] and the dental man power required to care for the needs.[4, 5] Other studies have been concerned with description of the age and geographic distribution of dentists,[6] the time required to provide dental services of various kinds and types,[7] and characteristics of clinical practice for children[8] and for adults.[9]

Equivalent data on the specialties of dentistry have as yet not been developed. The present report, therefore, has for its main purpose the description of some of the characteristics of one of these specialties, orthodontics. The analysis provides information on such items as: Where the orthodontic practitioners are located, their age distribution, the effect of size of city on the concentration of such practitioners, the proportion who have university training in the specialty, and the proportion who are specialists to the extent of full-time practice.

The material on which these analyses are based is derived from the list of dentists, practicing orthodontics exclusively or in conjunction with general dentistry, given in the publication, *Orthodontic Directory of the World.*[10] The information† listed therein was transferred to Hollerith punch cards and the various items of analysis were obtained from machine tabulations.

Age Distribution.—The exact ages of orthodontic practitioners are not available. Hence, information with regard to their age distribution must be derived indirectly from data giving the year of graduation from dental school. A reasonably acceptable age distribution can be obtained by assuming 24 years as the average age at graduation. The material given in Table I is derived on that basis. The 1,351 orthodontists distribute over the ages from 25 to 70 or more years. Nearly half of them (48.6 per cent) are within the ages 40 to 54 years. Approximately one-fourth are 25 to 39 years of age and the remaining one-fourth are 55 years of age or older. The 1,351 orthodontists are, on the average, 46.6 years of age, in contrast to all dentists who, on the average, are

From the Division of Public Health Methods, U. S. Public Health Service. The study was initiated while the author was assigned to the Department of Orthodontics, School of Dentistry, University of Michigan, during the school year 1946 to 1947.

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†The practitioners listed in the Directory were screened by the Editor from a larger group of dentists. The screening process was designed to eliminate those practitioners who evidence an interest in orthodontics but who do not actually perform orthodontic service.

about a year younger, 45.2 years. (Fig. 1.) This age difference may be explained on the basis of post-graduate time required for a proportion of the specialists, and by the probable circumstance that a fair proportion of the orthodontists begin practice in general dentistry and then later specialize in orthodontics.

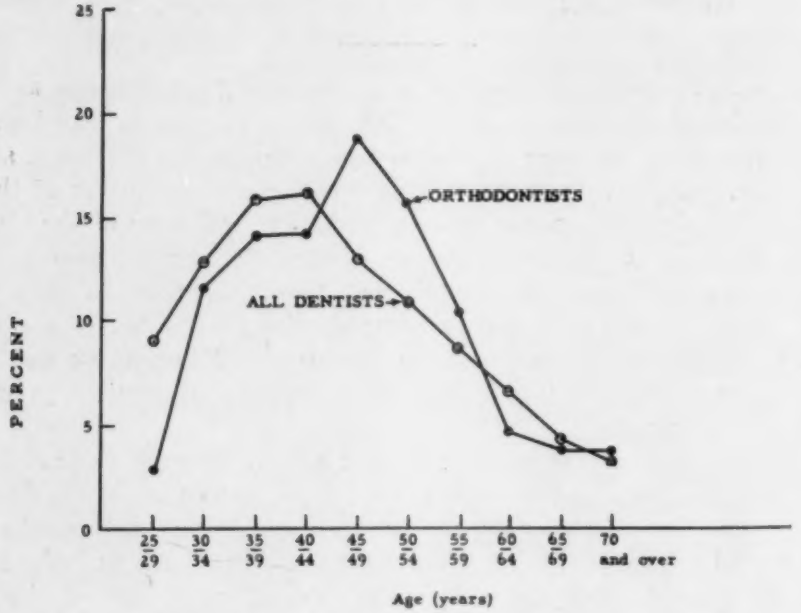

Fig. 1.—Age distribution of orthodontists compared with that of all dentists in the United States.

TABLE I. FOR CONTINENTAL UNITED STATES: NUMBER AND PER CENT OF DENTISTS, NUMBER AND PER CENT OF ORTHODONTISTS, AND PER CENT OF ORTHODONTISTS AMONG ALL DENTISTS BY YEAR OF GRADUATION FROM DENTAL SCHOOL AND BY AGE

YEAR OF GRADUATION*	AGE†	DENTISTS‡		ORTHODONTISTS§		PER CENT OF ORTHODONTISTS AMONG ALL DENTISTS
		NUMBER	PER CENT	NUMBER	PER CENT	
Previous to 1902	70 and over	2,160	3.2	49	3.6	2.3
1902-1906	65-69	2,952	4.3	50	3.7	1.7
1907-1911	60-64	4,514	6.6	63	4.7	1.4
1912-1916	55-59	5,958	8.7	141	10.4	2.4
1917-1921	50-54	7,394	10.8	212	15.7	2.9
1922-1926	45-49	8,828	12.9	254	18.8	2.9
1927-1931	40-44	11,051	16.1	191	14.1	1.7
1932-1936	35-39	10,891	15.9	191	14.1	1.8
1937-1941	30-34	8,792	12.8	155	11.5	1.8
1942-1946	25-29	6,148	9.0	39	2.9	0.6
All	All	68,588	100.0	1,351	100.0	2.0

*Year of graduation estimated by assuming average age of graduation to be 24 years for all dental practitioners. Year of graduation of orthodontists from *Orthodontic Directory of the World*, 1946.

†Age for all dental practitioners from United States Census, 1940. Age for orthodontists estimated from year of graduation assuming age at graduation from dental school as 24 years.

‡From United States Census, 1940.

§From *Orthodontic Directory of the World*, 1946.

Proportion of Orthodontists Among All Dentists.—The 1,351 orthodontists in practice in 1946 represent only 2 per cent of the approximately 69,000 dentists enumerated in the 1940 census.* The material shown in Table I indicates that the proportion of dental graduates entering orthodontic practice has varied only to a small extent over the past forty years. Among all dentists graduating earlier than 1902, less than 3 per cent are in orthodontic practice. Among dentists graduating since 1902, the proportion reporting orthodontic practice varies between 1.4 and 2.9 per cent, the lower proportion appearing among graduates of the years 1907 to 1911, the higher, for graduates of the decade from 1917 to 1926. Only 1.7 per cent of the graduates of the classes 1927 to 1931 report orthodontic practice, and about the same proportion is reported by graduates of the classes 1932 to 1941.

Among dentists graduating in the years 1942 to 1946, only 0.6 per cent report that they take orthodontic work in their practices. This rather significant drop in number of orthodontic practitioners among the most recent graduates probably reflects the effects of the recent war on graduate education of dentists in the orthodontic specialty.

Number of Orthodontic Office-Locations by States.—Orthodontic practitioners are located in every state as shown by the data given in Table II. A major proportion of the total of practitioners (83 per cent) have only a single office in one location. However, 215 practitioners divide their time between two offices located in adjoining cities in the same or adjacent states. Sixteen report that they divide their time among three offices while a total of six maintain four offices each. Multiple office-locations are reported by orthodontists of all but eight states (Alabama, Arizona, Delaware, Iowa, Maine, North Dakota, Utah, and Wyoming). These latter states, with the exception of Iowa, are characterized by having small total numbers of orthodontic practitioners. The states which show the highest numbers of multiple office-locations are the ones which have the highest concentrations of orthodontists (California, Illinois, Indiana, Massachusetts, Michigan, and New York).

Orthodontist-Population Ratios.—The several states may be compared in respect to concentration of orthodontic practitioners by expressing the number of such practitioners as a function of the population. As shown in Table III and Fig. 2, the number of practitioners per 100,000 of the population is highest (first quartile) in California, Nevada, District of Columbia, Connecticut, Colorado, Arizona, Delaware, Florida, New Jersey, New York, Massachusetts, Rhode Island, and Michigan. The concentration is least (fourth quartile) in Maine, Wisconsin, Utah, Kentucky, Arkansas, New Mexico, Alabama, South Carolina, South Dakota, West Virginia, North Dakota, and Mississippi.

About one-fourth of the states (the first quartile) have more than one-half the orthodontic practitioners, a rather uneven distribution which probably bears little relationship to the actual need for orthodontic service in the various states. Among several factors accounting for such unbalance, differences in

*The two groups (orthodontists and dentists as a whole) are not strictly comparable because of the six-year difference of time of enumeration. However, this difference would have little effect on the analysis here presented.

TABLE II. FOR CONTINENTAL UNITED STATES: NUMBER OF ORTHODONTISTS

NUMBER OF OFFICES	OFFICE-LOCATIONS	UNITED STATES	ALABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	DISTRICT OF COLUMBIA	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN
1	Single	1,114	8	8	8	139	19	32	4	14	27	13	2	72	21	24	17	11	15	4	9	41	55
2	First	215	–	–	–	27	1	1	–	–	2	1	1	11	1	–	2	–	3	–	5	12	13
	Second	215	–	–	1	27	1	4	–	2	2	2	2	14	1	–	4	1	2	–	5	16	12
3	First	16	–	–	–	4	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	3	1
	Second	16	–	–	–	4	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	3	1
	Third	16	–	–	–	5	–	–	–	–	–	–	–	1	2	–	–	–	–	–	–	2	1
4	First	6	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1	2
	Second	6	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	1	1	2
	Third	6	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	1	1	2
	Fourth	6	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	1	1	2
All*		1,351	8	8	9	170	20	35	4	15	29	15	3	87	25	24	20	12	18	4	15	58	71

*The orthodontist having two offices is counted as one-half an orthodontist at each office location. Likewise, the orthodontist with three offices is counted as one-third an orthodontist at each location, while the orthodontist with four offices is counted as one-fourth an orthodontist at each office location. Because of this procedure, the total of orthodontists for individual states does not appear as exact sums of the numbers in the vertical columns. They actually are calculated as decimal numbers which have been rounded here to the nearest whole number.

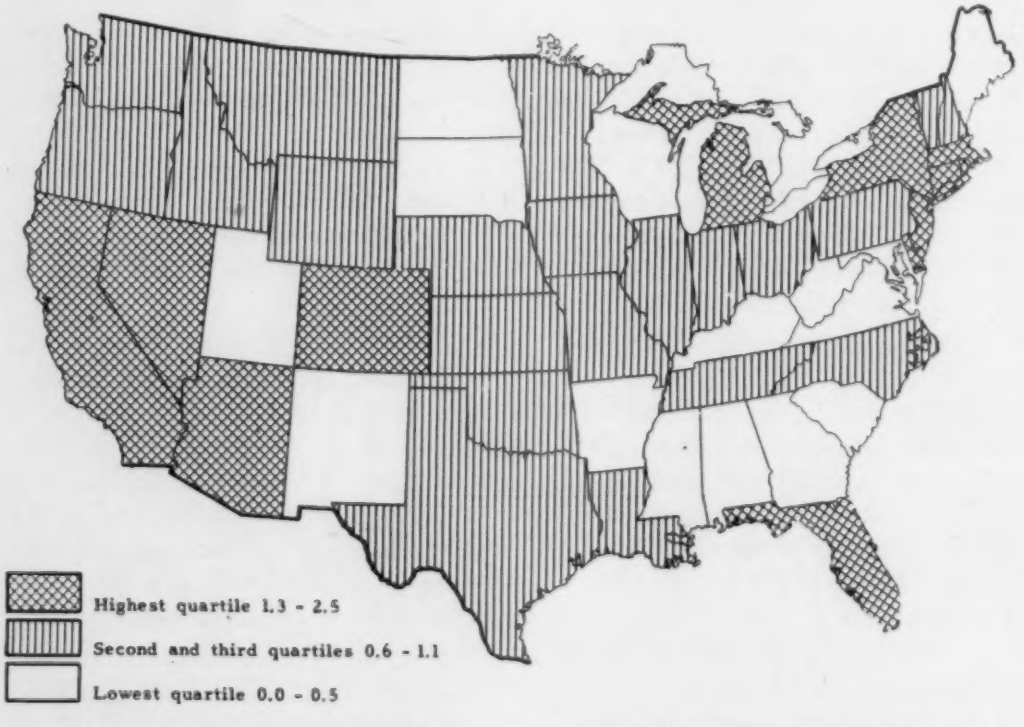

Fig. 2.—Concentration of orthodontists (number per 100,000 population) by states.

(EXCLUSIVE AND NONEXCLUSIVE) BY STATES AND NUMBER OF OFFICE-LOCATIONS

MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING
18	2	33	2	8	0	3	47	1	164	20	1	51	15	7	60	8	4	1	16	67	2	2	8	12	3	14	2
1	1	10	1	1	2	2	14	1	45	2	–	10	3	5	7	2	3	1	3	4	–	–	9	4	3	1	–
1	1	7	2	1	2	–	15	1	39	2	–	11	3	5	7	–	2	1	2	4	–	1	6	2	2	1	–
1	–	1	–	–	1	1	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–
1	–	1	–	–	1	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–
1	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–
–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	3	43	3	9	3	4	61	2	208	22	1	61	18	12	67	9	6	2	18	71	2	3	15	14	7	15	2

TABLE III. FOR CONTINENTAL UNITED STATES: NUMBER OF ORTHODONTISTS (EXCLUSIVE AND NONEXCLUSIVE) PER 100,000 PERSONS AND PER CENT OF ALL ORTHODONTISTS (EXCLUSIVE AND NONEXCLUSIVE) BY STATES AND BY QUARTILES OF STATES*

QUARTILE	STATE	ORTHODONTISTS PER 100,000 PERSONS	PER CENT OF ALL ORTHODONTISTS	QUARTILE	STATE	ORTHODONTISTS PER 100,000 PERSONS	PER CENT OF ALL ORTHODONTISTS
First Quartile	California	2.5	12.6	Third Quartile	Pennsylvania	0.7	5.0
	Nevada	2.5	0.2		Nebraska	0.7	0.7
	Connecticut	2.0	2.6		Minnesota	0.7	1.5
	Colorado	1.8	1.5		Louisiana	0.7	1.3
	Arizona	1.6	0.6		Indiana	0.7	1.8
	Delaware	1.5	0.3		Idaho	0.7	0.3
	Florida	1.5	2.1		Vermont	0.7	0.2
	New Jersey	1.5	4.6		Virginia	0.6	1.1
	New York	1.5	15.4		Tennessee	0.6	1.4
	Massachusetts	1.4	4.3		North Carolina	0.6	1.6
	Rhode Island	1.3	0.7		Montana	0.6	0.3
	Michigan	1.3	5.2		Georgia	0.5	1.1
	All		50.1		All		16.1
Second Quartile	Missouri	1.1	3.1	Fourth Quartile	Maine	0.5	0.3
	Oregon	1.1	0.9		Wisconsin	0.5	1.1
	Illinois	1.1	6.4		Utah	0.4	0.1
	Kansas	1.1	1.5		Kentucky	0.4	0.9
	Texas	1.1	5.3		Arkansas	0.4	0.6
	Washington	0.9	1.1		New Mexico	0.4	0.1
	Ohio	0.9	4.6		Alabama	0.3	0.6
	New Hampshire	0.9	0.3		South Carolina	0.3	0.5
	Iowa	0.9	1.8		South Dakota	0.3	0.1
	Oklahoma	0.8	1.3		West Virginia	0.3	0.5
	Maryland	0.8	1.1		North Dakota	0.2	0.1
	Wyoming	0.8	0.1		Mississippi	0.1	0.2
	All		27.5		All		5.1

*The District of Columbia is not shown in this table. It has 1.1 per cent of all the orthodontists in the United States and an orthodontist-population ratio of 2.3. This would place the District of Columbia in the first quartile range.

economic status probably play an important role. For example, the annual per capital income of the states in the first quartile averages approximately twice that of the states in the fourth quartile.

A more detailed view of the relationship between concentration of orthodontic practitioners and economic status can be obtained by relating (Fig. 3) the orthodontists-population ratio for each of the forty-eight states to the per capita income of those states.[11] The number of orthodontists per 100,000 population is influenced by the per capita income of the area. For example, the trend line fitted to the scatter of points shown in Fig. 3 suggests a fairly strong association between the number of orthodontists and income characteristics of the population. Thus, when the per capita income of an area averages about $500 per year, approximately five orthodontists are in practice per million of population. On the other hand, when the per capita income reaches $1,500 per year, the orthodontists number about fifteen per million population.

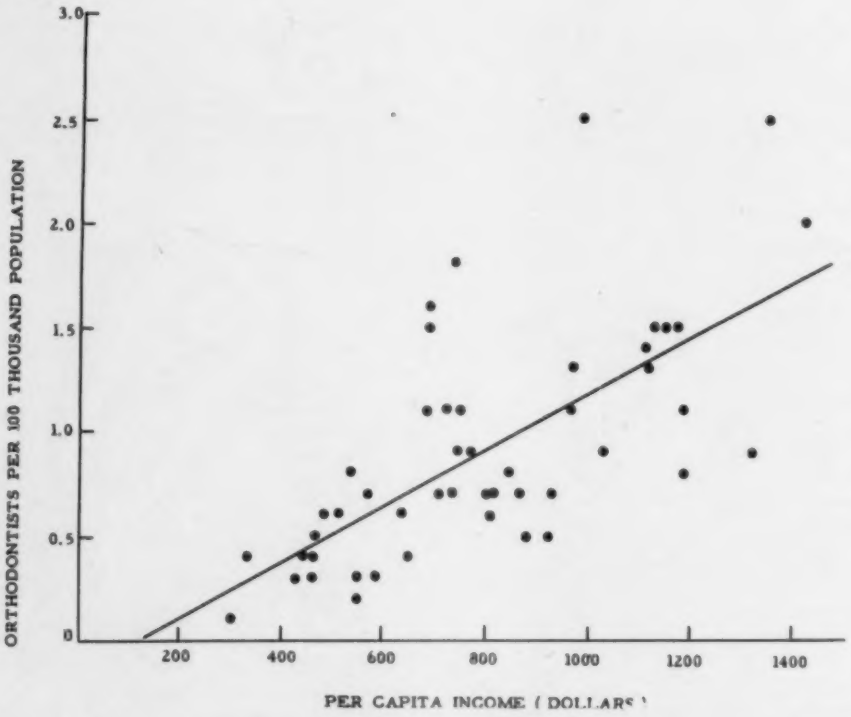

Fig. 3.—Relationship between concentration of orthodontists and per capita income for the forty-eight states (the trend line shown was fitted to the scatter of points by the method of least squares).

Year of Graduation and Number of Offices.—As shown previously, about 17 per cent of the 1,351 orthodontic practitioners in the United States divide their time among two or more office-locations, while the major proportion devote all their time to a single office-location. Year of graduation has some effect on the number of office-locations as shown in Table IV. Approximately 20 per cent of the orthodontists graduating previous to 1927 maintain two or more offices while less than 15 per cent graduating since 1927 maintain multiple

office-locations. Hence, a somewhat higher proportion of the older practitioners maintain two or more offices.

TABLE IV. FOR CONTINENTAL UNITED STATES: NUMBER AND PER CENT OF ORTHODONTISTS (EXCLUSIVE AND NONEXCLUSIVE) BY NUMBER OF OFFICES AND BY YEAR OF GRADUATION FROM DENTAL SCHOOL

YEAR GRADUATED	ORTHODONTISTS WITH SPECIFIED NUMBER OF OFFICES: NUMBER 1	NUMBER 2 OR MORE	NUMBER ALL	PER CENT 1	PER CENT 2 OR MORE	PER CENT ALL
Prior to 1902	41	8	49	83.7	16.3	100.0
1902-1906	40	10	50	80.0	20.0	100.0
1907-1911	49	14	63	77.8	22.2	100.0
1912-1916	112	29	141	79.4	20.6	100.0
1917-1921	175	37	212	82.5	17.5	100.0
1922-1926	203	51	254	79.9	20.1	100.0
1927-1931	158	33	191	82.7	17.2	100.0
1932-1936	160	31	191	83.8	16.2	100.0
1937-1941	137	18	155	88.4	11.6	100.0
1942-1946	34	5	39	87.2	12.8	100.0
Unknown	5	1	6	83.3	16.7	100.0
All	1,114	237	1,351	82.5	17.5	100.0

Size of Community and Number of Orthodontists.—The 1,351 orthodontic practitioners in the United States are distributed among a total of 566 communities in the United States.* Among these communities having one or more orthodontists, more than two-thirds are places of less than 50,000 persons. As shown by the material given in Table V, the lowest concentration of orthodontists (number per 100,000 population), 0.6, is encountered in communities having less than 10,000 persons. The concentration of orthodontists is highest for cities having one million or more population.

TABLE V. FOR CONTINENTAL UNITED STATES: NUMBER OF ORTHODONTISTS, POPULATION OF COMMUNITIES, AND NUMBER OF ORTHODONTISTS PER 100,000 POPULATION BY SIZE OF URBAN COMMUNITIES

ITEM SPECIFIED	SIZE OF COMMUNITY (THOUSANDS OF PERSONS): UNDER 10	10-50	50-100	100-500	500-1,000	1,000 OR MORE	ALL
Number of orthodontists*	67	342	124	351	85	382	1,351
Number of communities†	2,377	878	107	78	9	5	3,454
Population‡	11,708	17,384	7,344	15,620	6,457	15,911	74,424
Orthodontists per 100,000 population	0.6	2.0	1.7	2.2	1.3	2.4	1.8

*From *Orthodontic Directory of the World*, 1946.
†From United States Census, 1940.
‡From United States Census, 1940 (thousands of persons).

*The total number of communities listed in the *Orthodontic Directory of the World* exceeds 566 by a small number. However, in several instances, sections of a city are listed as separate communities in the Directory. For example, in New York State the borough of Brooklyn is listed separately from Manhattan although in the present study both are included within New York City proper.

TABLE VI. FOR CONTINENTAL UNITED STATES: NUMBER AND PER CENT OF ORTHODONTISTS (EXCLUSIVE AND NONEXCLUSIVE) BY NUMBER OF OFFICE-LOCATIONS AND BY SIZE OF COMMUNITY OF PRACTICE

NUMBER OF OFFICE LOCATIONS		SIZE OF COMMUNITY (THOUSANDS OF PERSONS)													
		UNDER 10	10-49	50-99	100-149	150-199	200-299	300-399	400-499	500-599	600-999	1,000-1,999	2,000-3,999	4,000 OR MORE	ALL
One	Number	38	248	102	84	50	55	77	60	37	43	69	151	100	1,114
	Per cent	56.7	72.5	82.3	90.3	92.6	94.8	94.8	92.3	92.5	95.6	83.1	85.8	77.0	82.5
Two or more	Number	29	94	22	9	4	3	4	5	3	2	14	25	23	237
	Per cent	43.3	27.5	17.7	9.7	7.4	5.2	5.2	7.7	7.5	4.4	16.9	14.2	23.0	17.5
All*	Number	67	342	124	93	54	58	81	65	40	45	83	176	123	1,351
	Per cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*See footnote to Table II.

Within the continental limits of the United States, 97 per cent of the communities of under 10,000 population do not have orthodontic practitioners. Also, approximately two-thirds of the 878 communities of 10,000 to 50,000 population have none, while about half of the 107 cities of 50,000 to 100,000 population do not have orthodontic practitioners. All cities of 100,000 or more population have one or more such practitioners.

Size of city is also related to the number of multiple-office practitioners. As indicated in Table VI, of the 1,351 practitioners in the United States, 83 per cent practice in a single office-location. Of these, fully one-fourth practice in communities where the population is fewer than 50,000 persons while another one-fourth practice in cities of 1,000,000 or more persons. Among the orthodontists practicing in cities of under 10,000 persons, approximately 43 per cent of them have two or more office-locations. Among cities of various sizes, those with fewer than 10,000 persons show the highest proportion of orthodontists with multiple office-locations. The smaller proportions of orthodontists with multiple offices are found in cities of between 150,000 and 1,000,000 persons. In cities of 1,000,000 or more persons, a larger proportion of orthodontists have multiple offices, the proportion reaching 23 per cent in cities of 4,000,000 or more persons.

*University graduate training.**—A little more than one-third (36.4 per cent) of the 1,351 practitioners indicate that they have had university graduate training in orthodontics (Table VII). Year of graduation from dental school is rather closely related to the proportion of orthodontists with university training in the specialty. As shown in Fig. 4 and in Table VII, the proportion of orthodontists with such training increases gradually from a low of 6.1 per cent among dental school graduates of the years previous to 1902 to about 16 per cent among orthodontists graduating in the years 1917 to 1921. In the following five-year period, a marked increase occurs. Hence, nearly 41 per cent of the orthodontists receiving the D.D.S. degree in the years 1922 to 1926 report that they subsequently have had university graduate training in the specialty. Again over the next decade (1927 to 1936), the rise is maintained so that among orthodontists graduating in dentistry over the period 1932 to 1936 more than 61 per cent report university graduate orthodontic training. In the following five-year period (1937 to 1941), the proportion reporting such training drops slightly to about 59 per cent. Finally, during the war years, and presumably because of the war-time conditions, over the period 1942 to 1946, fewer than 30 per cent of the orthodontists graduating in those latter years report university graduate training in the specialty.

American Board of Orthodontics.†—Certification by the American Board of Orthodontics is reported by fewer than one-sixth (14.7 per cent) of the

*The listing of orthodontic practitioners in *Orthodontic Directory of the World* gives information with regard to the school at which graduate training was received. A total of twenty-three schools are identified of which nineteen are affiliated with universities. In the analysis given here, an orthodontist is considered to have received university graduate training only when it is indicated that the training was received at a graduate school affiliated with a university.

†The Board was created in July, 1929, by the American Association of Orthodontists. The requirements for the certificate of the Board include exclusive practice of orthodontics for five years, one full year or more of which may have been spent in exclusive graduate study of orthodontics in a school satisfactory to the Board.

1,351 orthodontic practitioners. As shown in Table VII and by Fig. 5, the proportion of orthodontic practitioners who (as of 1946) hold the certificate increases consistently with time since graduation from dental school. Among orthodontists graduating from dental school previous to the year 1902, about

TABLE VII. FOR CONTINENTAL UNITED STATES: NUMBER AND PER CENT OF ORTHODONTISTS (EXCLUSIVE AND NONEXCLUSIVE) WITH UNIVERSITY GRADUATE TRAINING, CERTIFIED BY AMERICAN BOARD OF ORTHODONTICS OR IN EXCLUSIVE PRACTICE OF ORTHODONTICS BY YEAR OF GRADUATION FROM DENTAL SCHOOL

YEAR GRADUATED	GRADUATE TRAINING	A. B. O.	EXCLUSIVE PRACTICE	GRADUATE TRAINING	A. B. O.	EXCLUSIVE PRACTICE
	NUMBER			PER CENT		
Previous to 1902	3	12	42	6.1	24.5	85.7
1902-1906	4	15	41	8.0	30.0	82.0
1907-1911	4	20	58	6.3	31.7	92.1
1912-1916	21	35	115	14.9	24.8	81.6
1917-1921	35	51	190	16.5	24.1	89.6
1922-1926	103	37	219	40.6	14.6	86.2
1927-1931	103	20	153	53.9	10.5	80.1
1932-1936	117	6	163	61.3	3.1	85.3
1937-1941	91	3	122	58.7	1.9	78.7
1942-1946	11	0	32	28.2	0.0	82.1
Unknown	0	0	3	0.0	0.0	50.0
All	492	199*	1,138	36.4	14.7	84.2

*The booklet of information issued in 1947 by the American Board of Orthodontics lists a total of 226 living orthodontists who hold the certificate.

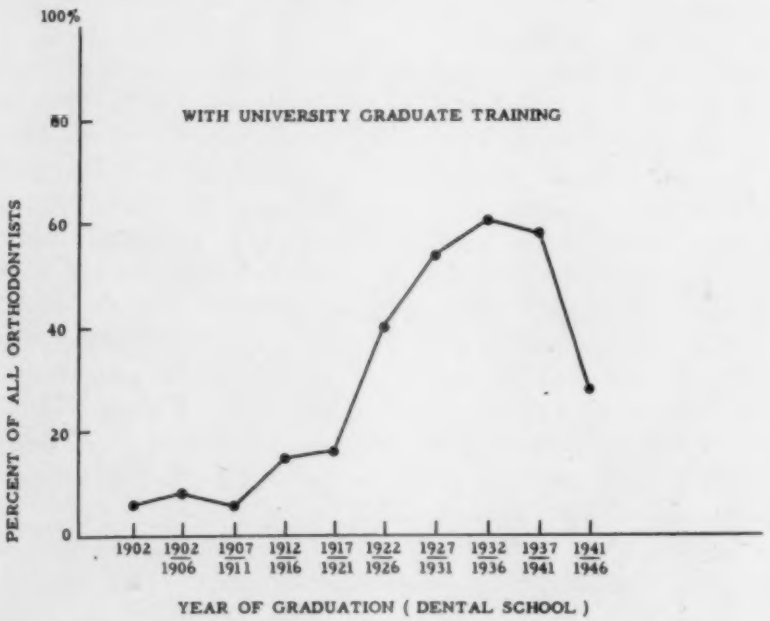

Fig. 4.—Relationship between year of graduation from dental school and the proportion of orthodontists with university training in the specialty.

one-fourth (24.5 per cent) hold the certificate. The proportion then rises to a peak of nearly one-third of the practitioners graduating in the years 1907 to 1911. In the following years, the proportion of orthodontists with the certificate drops gradually and consistently to fewer than one-fourth among grad-

uates of the years 1917 to 1921, to approximately 10 per cent among graduates of the years 1927 to 1931, and finally to the lowest point for graduates of the years 1937 to 1941. Less than 2 per cent of them hold the certificate.

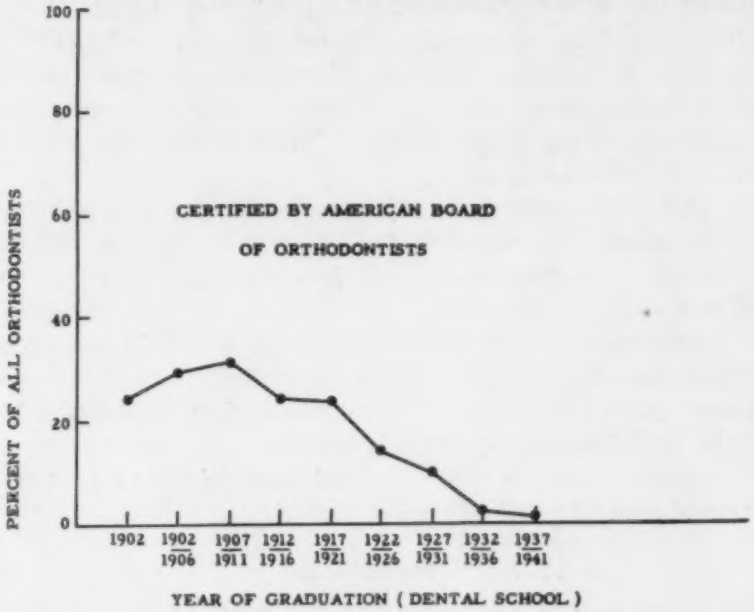

Fig. 5.—Relationship between year of graduation from dental school and the proportion of orthodontists holding the certificate of the American Board of Orthodontics.

Exclusive Practice.—Among the 1,351 dentists who report orthodontic practice, 1,138 or approximately 84 per cent are in exclusive practice; that is, they devote all their professional time to orthodontics. It is of interest to note (Table VII) that year of graduation from dental school has little effect on the proportion of practitioners reporting exclusive practice. The highest proportion in exclusive practice (92.1 per cent) is found among graduates of the years 1907 to 1911. This group of orthodontists also have the highest proportion with certificates from the American Board of Orthodontics. However, they are next to the lowest in terms of the proportion with graduate university training in the specialty. The lowest proportion of practitioners in exclusive practice is found among those orthodontists who graduated from dental school in the years 1937 to 1941; again, perhaps, a result of conditions associated with the war.

SUMMARY

1. There are approximately 1,351 dentists in the continental United States who report that they practice orthodontics either full time or in conjunction with general dentistry.

2. Orthodontic practitioners represent only 2 per cent of all dentists in the United States.

3. One or more orthodontists are located in each of the forty-eight states and the District of Columbia. North Dakota has the smallest absolute number (one) while New York has the largest (208).

4. The concentration of orthodontists (orthodontist per 100,000 population) is highest in California and Nevada (2.5) and lowest in Mississippi (0.1) and is influenced, among other factors, by the per capita income of the state.

5. Half of the orthodontists in the United States practice in twelve states, the majority of which are on the Eastern seaboard and the West Coast.

6. The major proportion of orthodontic practitioners maintain only a single office-location; but about 17 per cent of them maintain two or more office-locations in adjoining cities or adjacent states. More of the older practitioners tend to have multiple office-locations.

7. The highest concentration of orthodontic practitioners (orthodontists per 100,000 population) is found in the larger cities of 1,000,000 or more population, while the lowest concentration is encountered in cities having fewer than 10,000 population.

8. More than 84 per cent of the orthodontic practitioners report that they are in exclusive practice of the specialty.

9. Fewer than 15 per cent of the orthodontic practitioners hold the certificate of the American Board of Orthodontics.

10. About 36 per cent of the orthodontic practitioners report that they have had university graduate training in the specialty.

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TREATMENT AIMS AND LIMITATIONS

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THE practitioner of clinical orthodontics must make daily decisions which, over a period of years, aggregate themselves into a "philosophy" of treatment. As a result of this philosophy, he uses certain appliances, he believes in extraction of certain teeth or he does not, he treats at all ages or he refuses to treat at certain ages, he accepts certain limitations or he is optimistic about all treatment possibilities, to mention but a few points in concept. There seem to be such differences in philosophy on these points and others among orthodontists that, instead of a healthy difference of opinion on some phases of treatment, often there is confusion about fundamentals.

It would seem that the logical practical objective of any medical or dental treatment is to restore the person under treatment to as nearly normal as possible under the circumstances. Judging from conversations with my fellow practitioners in orthodontics and from examination of the literature, there is certainly almost complete disagreement on what is normal and, therefore, what orthodontic treatment objectives are. One of the fundamental points of difference of opinion concerns the axial position of the mandibular incisors. If there were more agreement on what the desired axial position of these teeth is, part of the confusion in orthodontic treatment objectives would automatically resolve itself. There seem to be two opposite views on this problem. One concept holds that in treatment the mandibular incisors should be positioned in such labiolingual-axial inclination that they assume a position of 85° to 95° to the mandibular plane, preferably that these teeth are placed in lingual-axial inclination, assuming a position of 85° to the mandibular plane. The reason for this treatment concept has been concisely stated thus:

> It is only remotely possible that any orthodontist will ever be able to examine a patient and accurately predetermine where, in this scale of minus 5 to plus 5, the mandibular incisors must be positioned in order to be in functional and mechanical balance. Our endeavors in treatment must, therefore, be to place the mandibular incisors at minus 5 on the scale in order to safeguard against relapse. Most of us agree that there is little likelihood of positioning the denture too far distally in relation to the basal bones, and that if we should err in this direction, function will drive the denture forward so that eventually it will find its functional balance point somewhere within the range of minus 5 to plus 5. Experience has proved that ordinarily it is impossible for function to make such a correction when treatment

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has left the denture in protrusion. In such cases we have all experienced collapse and failure in the lower incisal region as Nature endeavored to bring the denture back to functional mechanical balance.

This concept appears logical, and, when put to actual clinical application, the results, although difficult of attainment, are satisfactory.

Another concept apparently holds that there is so much normal variation in the axial position of the mandibular incisors, as in other anatomic features, that it is impossible to predetermine where these teeth should be positioned and, further, even though these teeth are procumbent at the end of treatment, Nature will upright them and function will gradually develop a sufficient bony base to support them. Furthermore, there is a reasonable objection to using averages and applying them to individuals since each individual is an entity and, although measuring large numbers of individuals gives us an average, no average is necessarily any individual's norm.

While this concept also appears logical enough, actually clinical results from following this line of reasoning are too often disappointing. While it is true that Nature takes over eventually, Nature fails us too often either in failing to develop sufficient bony base as a result of function, because the individual's growth potential is not adequate, or if the mandibular incisors which are left procumbent do upright themselves, they crowd themselves into the segment of a smaller circle and relapse is inevitable. Most of us have seen this happen even after prolonged retention and, occasionally, even during retention and in spite of retention. This is very discouraging and leads one to believe that clinically it is safer to position the mandibular incisors in lingual-axial position so that relapse, if any, will not be serious.

Here is an impasse in orthodontic thought and concept of treatment objectives. It is serious because it is fundamental. It must be resolved in a practical manner. More research is necessary on this problem. There must be a logical starting point somewhere on which orthodontic treatment objectives can be based. With due respect for normal variations in the position of all teeth, we cannot escape the fact that studies on normals show consistently that the mandibular incisors are in significant percentage approximately at right angles to the mandibular plane. This has been shown consistently enough by different workers to justify its consideration in treatment. For example, fairly recently Speidel and Stoner have shown in studies of normal occlusions that in 69.3 per cent of all cases studied, the mandibular incisor-axial inclination falls within a range of 10°, from 5° plus to 5° minus in relation to a line at right angles to the mandibular plane. In other words, the mandibular incisors of seven out of ten individuals studied were within this range, according to Speidel and Stoner. Do we routinely position the mandibular incisors within these limits in even 70 per cent of our cases? If we do, we are approaching the normal. Is it logical to agree that we should position the mandibular incisors properly even in 70 per cent of our cases? If we agree on this, it follows that, since no one can predict whether the particular individual under treatment is one of the seven out of ten individuals

whose mandibular incisors should be within this range, it is logical to attempt to position these teeth properly in all cases to be on the safe side. Yet it seems that we have been creating bimaxillary protrusions in our treatment for so long that we look upon them as within the normal range although they are not. At present, it does not seem any more illogical to accept a mandibular-incisor angle of approximately 85° with the mandibular plane as an objective in treatment than it is illogical to accept any of the "normals" in medicine such as blood count norms, blood pressure norms, height and weight averages, and basal metabolism limits.

The mandibular-incisor-axial position is also a fundamental in the consideration of the extraction problem in orthodontics. If one believes that he is not approximating the normal in treatment unless the mandibular incisors are properly positioned, he will have to extract teeth in a percentage of cases, since it is neither mechanically or practically possible in all cases to position and maintain a full complement of thirty-two teeth in proper relation to the underlying structures. Extraction has been called "compromise treatment." A reduction in the number of teeth to make possible an approximation of normal incisor-axial position is no more a compromise than the retention of thirty-two teeth, with abnormal incisor-axial position and possible collapse as the end result. Either both procedures are compromises, or neither is. I believe that reducing the amount of tooth substance is the only procedure whereby certain cases can possibly be treated with permanent benefit to the patient.

However, extraction in connection with orthodontic treatment must never be mistaken for an "easy way" out of our problems. Reducing the amount of tooth substance certainly makes possible certain objectives which are impossible to attain when all teeth are retained in certain cases. As Tweed has pointed out, these objectives are:

1. Stability of end result.
2. Healthy investing tissues.
3. An efficient dental apparatus.
4. The best in facial esthetics.

But even in extraction treatment, these objectives are not easily reached. There are certainly many difficulties in attaining them, and we must face these problems, too. One objection to extraction has been that so-called "open contacts" have been left in the finished case. This is a valid objection because from a periodontal standpoint, "open contacts" are undesirable. In this connection, I recently examined clinically twenty-five extraction cases which have been out of active treatment for periods ranging from three months to fifty-five months. An attempt was made to check the contact points in these cases, using dental floss to determine the percentage of open contacts.

The total number of contact points examined was 535. The number of open contacts was 133. The percentage of open contacts was 24.86 per cent. The percentage of satisfactory contacts was 75.14 per cent in the group as a whole.

As we would expect, the greatest number of open contacts (63) was found in the canine-second premolar areas. In addition, a number (twenty-eight) were found in the maxillary canine-lateral incisor areas. The rest were fairly evenly distributed. The canine-lateral open contacts were probably partly due to placing the canines too far buccally or too far occlusally, or both. It is quite possible that the maxillary anterior open contacts were caused by too great anterior overbite. There seems to be a tendency for the bite to close as spaces are reduced, although most guesses regarding overbite require cephalometric proof. The recent work of Wylie, Thompson, and Brodie offers us hope in solving our problems in the vertical range and is worthy of our serious study and consideration.

Further examination of these extraction cases showed that the number of open contacts seemed smaller in the older cases. Five of these which were out of retention on an average of twenty-two months showed a percentage of 8.18 per cent of open contacts as compared with 24.86 per cent in the group as a whole. The percentage of satisfactory contacts was 91.82 per cent, as compared with 75.14 per cent in the whole group.

The real value of this small survey would lie in rechecking these mouths five years after all retention is discontinued and examining not only contact points but also axial positionings, facial contours, general gum and bone conditions, and stability of the masticatory organ as a whole as shown by the relation of teeth to basal bone. It would then be interesting to compare these cases with a similar check on a similar number of treated cases in which full complements of thirty-two teeth have been maintained. We all have seen open contacts in so-called untreated normals which have stood the test of time. I would be quite satisfied if my finished results could approximate these routinely, even though some contacts are open.

I am of the present opinion that a good percentage of open contacts tends to satisfactory reduction as retention is discontinued. Some never seem to close, just as so-called untreated normals show open contacts at all ages without apparent harm to the investing tissues. If an open contact causing food impaction persists, it should be closed by operative dentistry. The term "reducing spaces" is better than the term "closing spaces." If a choice had to be made, I would prefer an open contact to the gum and bone recession caused by forcing teeth beyond the investing tissue limits in which they can be healthfully accommodated.

Another difficulty in handling extraction cases has been maintaining or correcting the axial inclinations of the second premolars. Two procedures are important in correct axial positioning of the second premolars. First, if possible, tip the teeth posterior to the first premolars into a position of distal axial inclination before extracting first premolars, and, second, alternate space-closing arch wires and plain arch wires into which strong second order bends are placed in the premolar and molar areas during reduction of spaces. This requires definite premolar control. These procedures have been explained by Tweed, as applied to the edgewise arch mechanism, and, if followed, the resulting axial inclination of the second premolars is more satisfactory than

when attention has not been paid to these details. Whatever mechanism is used, an attempt must be made to keep the posterior teeth upright during space reduction.

Another condition to avoid, if possible, is found in the posterior movement of the canines. Occasionally, it will be found that the apices of these teeth have been moved too close to the labial bony plates, with a thin layer of bone over the entire labial root surface. This is caused by carrying the canines too far buccally. I have found it helpful to keep in mind the concept of the "channel" between the labial and lingual plates of bone in trying to guide the canines distally, with the added reminder that, after extraction, as a result of resorption, the area into which the canine is moving is probably thinner buccolingually than before extraction. It takes but a moment to palpate the apical areas of the canines to determine whether they are well within bony support. This should be done routinely.

In a sense, all medical treatment is compromise, and orthodontics is no exception. Treatment planning usually resolves itself into choosing the least of several possible evils. This suggests that there are further limitations in orthodontic therapy which must be recognized.

To the best of my knowledge, one of the earlier contemporary discussions on orthodontic limitations was by deVries in 1933. In many respects, deVries was prophetic in his evaluation of orthodontic limitations, as the experience of the past thirteen years has shown. Since that time, more consideration has been given this subject since we have found from disappointing clinical results that certain treatment limitations cannot be ignored. In respect to growth limitations, Krogman has calculated certain figures from Hellman on the relation of facial growth to growth type-pattern. He said, "At birth 39 per cent of height, 57 per cent of width, measured against adult size, have been achieved. In the first five years 78 per cent of height, 85 per cent of width, 82 per cent of depth have been achieved. . . . The importance here is . . . the fact that after 5 years of age only 15-20 per cent of growth increments remain as avenues of possible readjustment." Quoting Goldstein, Krogman said further, "In every one of the foregoing dimensions 90 per cent or more of final adult size (general growth) has been attained by the age of twelve years." Quoting Todd, Krogman said, "In infancy, when the constitution is most susceptible to disturbance, it is the face rather than any other part of the body which registers permanent damage through interruption of facial growth, a damage which shows little tendency to repair and is forever afterward merely compensated by structural modification," and, quoting Rosenberg, he said, "already by the age of 5 years the pattern of upper facial development is established. Defects of growth originate, therefore, in early childhood." And, further, "Brodie (1940) states that the morpho-genetic pattern of the head is established by the third post-natal month and that once attained it does not change."

Apparently, a recognition of these and other quite specific limitations in orthodontic therapy is developing. In the first place, the orthodontist can influence the fundamental growth potential of an individual's maxilla and

mandible slightly, if at all, at the age when most treatment is started, because of the inherent growth limitation, even assuming that the individual under treatment has had the best possible health history. Second, the orthodontist cannot change the "morphogenetic pattern" of the bones. Third, there is a limitation due to the size and shape of the individual's teeth, although the number of teeth can be reduced. The fundamental bone shape and form remain constant, although some changes can be made in the alveolar portion.

In talking with his orthodontic colleagues and reading the literature, one finds further that there is a remarkable difference of opinion as to the proper time for starting treatment. Some apparently believe that orthodontic stimulus is so effective during mixed dentition as not only to prevent a severe malocclusion from developing, but also to eliminate the necessity for treatment at a later age in a large percentage of cases. Experience has shown that this is not as true as one would hope. Treatment of mixed dentures has been distinctly unsatisfactory in too many instances, requiring extensive treatment of the permanent dentures. It has been generally accepted that early treatment in most cases of malocclusion is advisable, but, to the best of my knowledge no one has showed proof that a high percentage of cases treated in the mixed dentition stage have been so successful as to require little or no treatment of the permanent denture. Yet, we can all show a large number of cases so treated which are unsatisfactory and which do require extensive retreatment. Until someone presents a significant series of cases treated in the mixed dentition stage in which results were so satisfactory as to justify treatment at this age, the inference must be that, although some improvement in gross abnormalities is possible, as in Class I cases with Class III tooth relationships, much more proof is necessary before treatment in many mixed dentitions can be considered good procedure. This is a limitation which does not seem generally to be accepted.

For many years, we have felt that expanding the dental arches offers hope in providing space for correcting irregular teeth and that the jaws will grow in a lateral direction to accommodate the teeth in their new positions. Unfortunately, this is not an entirely satisfactory procedure. Some changes apparently do take place in the alveolar portions of the bone, but the base apparently remains about the same as though no appliance stimulus had been used. As Strang pointed out, expansion possibilities are very limited. It is possible to place the buccal teeth in buccal protrusion, with consequent relapse, by overexpansion. Retention, even over a long period of time, does not seem to help much. Indeed, retention is probably misused in orthodontics. Often it would seem better to allow the teeth to find the balance which they are going to find eventually anyway, after a short period of retention, rather than to prolong retention indefinitely by holding teeth in positions of imbalance which they will not maintain. One measurement of success in treatment is shortness of retention which is necessary. The greater the expansion or deviation from typal arch form, the greater the need for and length of retention. If the mandibular dental ridge is used as a guide to typal arch form and there is as little deviation as possible from this guide, results will be

more esthetic and more stable. One sees failure in bone response so often that he is tempted to fit the teeth to the bone, as is done in prosthetic dentistry. Perhaps this could be called a defeatist attitude, since surely we would not be attempting to do all that we would like to think we can do with orthodontic appliances. Perhaps, on the other hand, this is a recognition of some of our limitations in orthodontic treatment. From a practical standpoint, however, if we can position the mandibular incisors properly over basal bone and at the same time refrain from straying too far from the typal arch form which Nature has provided for the individual, our results will be more stable, the investing tissues will be more healthy, the dental apparatus will function efficiently, and facial contours will be improved.

In this discussion, which is purely clinical and not presumed to be scientific, attention has been directed to the need for agreement on some fundamental points in treatment concept. It is to be hoped that, through further work and study, some of our problems will be resolved for the ultimate good of our patients. Some fundamental points of treatment objectives on which agreement must be reached are:

1. The axial position of the mandibular incisors.
2. Extraction in connection with orthodontic therapy.
3. Limitations in orthodontic therapy.

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1100 MEDICAL ARTS BUILDING.

ORTHODONTIC NOMENCLATURE

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DR. E. H. ANGLE in his book, *Malocclusion of the Teeth,* states: "A definite nomenclature is as necessary in Orthodontia as in Anatomy. The vagueness of descriptive terms often used renders them very inadequate. The terms for describing the various malpositions should be so precise as to convey at once a clear idea of the nature of the malocclusion to be corrected."

A new science like orthodontics has the opportunity of developing a nomenclature with fixed bases to permit the better knowledge of its scope and thus avoid "the vagueness of descriptive terms" which "renders them very inadequate."

The nomenclature in orthodontics is more important than in other fields of human knowledge because *orthodontics is a science which deals with the facial and oral morphology in its different stages of growth and development and with the knowledge, prevention, and correction of these normal morphologic deviations.*

We have a nomenclature for describing the craniofacial morphology taken from the anatomy and anthropology, but we have no nomenclature to describe the deviations from normal facial and oral morphology. Except for the anomalies of occlusion in which correct terms are used, there are few terms to describe clearly the anomalies of position and size of the jaws, in their different parts, of the lips and oral orifice, of the teeth in relation with the dental arches, the jaws, and the body planes.

A review of the present-day orthodontic literature permits us to verify the importance that is given to the study of the jaws, lips, temporomandibular joints, position of the teeth in relation to the jaws and the body planes, etc. But is there some accepted nomenclature for all these deviations from the normal? A few proper terms are used, but generally "the vagueness of descriptive terms" with common words, is employed. The distinction between professional men and ordinary people is that the former employ a technical language, to learn which they were obliged to employ a previous mental discipline, facilitating the reasoning, the clarity, and the rapidity of their thoughts and the interchange of ideas.

In the past, when only intraoral diagnosis was made, it was sufficient to employ terms to express the relation of the teeth with the plane of occlusion. But now, with the facial diagnosis by means of profile and front roentgenograms, craniofacial measurements, etc., we find many other anomalies of

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position, direction, size and shape of the jaws, teeth in relation with the jaws and the body planes, temporomandibular joints and soft parts, especially the lips. We need to give appropriate names to all these deviations from normal, and to classify them.

The orthodontic nomenclature, as well as that of anthropology, many of whose terms we are using, must be taken from Greek and Latin roots. The names to designate the deviations from normal facial and oral morphology, in their different stages of growth and development, must give us a clear idea: *(1) of the place or seat of the anomaly; (2) of the nature or class of the deviation.*

Many nomenclatures that have been proposed do not fulfill these requisites, and employ inadequate terms, that is, "protrusion," which means *pro,* in front of, and *trudere,* impel with force, referring to anomalies of position and direction of the jaws or lips. The word "trusion" is inadequate, because it does not express the place of the anomaly and has also a pathogenic significance (impel with force) which does not correspond with the reality. Following the requisites that we have stated before, it is possible to say "prognathism" (this also has a great use) which means *pro,* in front (deviation), and *gnathos,* jaw (place), or "procheilia" which means *pro,* in front and *cheilos,* lip. These terms have not a pathogenic significance; they mean only that the jaw or the lip is located in front of the place which is considered normal.

Some classifications use a nomenclature in reference to some planes of the body or other procedures of diagnosis, and thus limit their application when, by progress, the diagnostic procedures are changed. This is the case of the Simon classification, whose terms are made in relation with the Frankfort, sagittal, and orbital planes. What do we do if we use the Bolton plane or other procedures of diagnosis? The nomenclature made in accordance with the conditions we have mentioned before is not subordinate to any plane or procedure. It states only the place of the anomaly and the nature of the deviation.

To simplify and clarify the use of this nomenclature, it is well to remember that many Greek and Latin roots are used to designate anomalies of different places. Then, it is possible to give an exact name of the anomaly we are studying, having in mind only some roots. The most important roots in orthodontics are those to designate anomalies of position, direction, size and shape, which are the following:

ROOTS TO DESIGNATE THE PLACE OR SEAT OF THE ANOMALY

cheilos, lip
stoma, mouth
gnathos, jaw
géneion, chin
gonía, angle (of the mandible)
odontos, teeth
condyle, part of the mandible
occlusion, relation between the teeth of the upper and lower arches

ROOTS TO DESIGNATE THE NATURE OR CLASS OF THE DEVIATION

- Changes of position and direction of the soft parts, jaws, and temporomandibular joints
  - *pro*, in front
  - *retro*, back
  - *dextro*, right side
  - *levo*, left side
  - *supra*, above
  - *infra*, below
- Changes of position and direction of the teeth
  - *gression*, to walk, step, move (change of position)
  - *version*, to turn (change of direction, turning around a horizontal axis)
  - *rotation*, wheel (change of direction, turning around a vertical axis)
  - *linguo*, toward the tongue
  - *labio* or *bucco*, toward the lips or cheek
  - *mesio*, toward the middle of the dental arch
  - *disto*, toward the extremes of the dental arch
  - *in*, in or into
  - *e* (ex) outside, out of
- Changes of the occlusion
  - *linguo*, toward the tongue
  - *labio* or *bucco*, toward the lips or cheek
  - *mesio*, toward the middle of the dental arch
  - *disto*, toward the extremes of the dental arch
  - *hyper*, excess
  - *hypo*, defect, less
- Changes of size of the soft parts and jaws
  - *macro*, large
    - vertical
    - anteroposterior
    - transversal
  - *micro*, small
    - vertical
    - anteroposterior
    - transversal
- Changes of size of the teeth
  - *macro*, large
    - total
    - crown
    - root
  - *micro*, small
    - total
    - crown
    - root

Anomalies of shape of the soft parts, jaws, and teeth are designated with the roots employed in our article, "On the Classification of Dentofacial Anomalies."

To illustrate the use of this nomenclature we give a practical example: Nomenclature of the anomalies of position of the temporomandibular joints: Root to designate the place or seat of the anomaly, "condylism," abnormal position of the condyle. Roots to designate the nature or class of the deviation: *pro, retro, dextro, levo, supra, infra,* with which we can express the deviations from normal in the three directions of space:

Anteroposterior Deviations:

procondylism: condyles in front (Fig. 1)
retrocondylism: condyles in back

Transversal Deviations:

dextrocondylism: condyles toward the right side
levocondylism: condyles toward the left side

Vertical Deviations:

supracondylism: condyles above (Fig. 2)
infracondylism: condyles below

Fig. 1.—Procondylism—forward deviation of the condyles in relation to the normal position.

Fig. 2.—Supracondylism—the condyles are situated above the normal in relation to the Frankfort plane.

In the same manner we can give appropriate names to the anomalies of position and direction of the soft parts, jaws (Figs. 3 and 4), teeth, and occlusion, using the roots we have given before. The anomalies of size are easier to designate because there are only *macro* (large) and *micro* (small), which we can make more exact by stating the changes in size of the three directions of space: anteroposterior, transversal, and vertical: example, anomalies of size of the jaws (Figs. 5, 6, 7, 8, and 9).

Fig. 3.—Upper and lower total prognathism—both jaws are deviated forward.

To emphasize the precision of the terminology made in accordance with the rules stated before, we can compare with the terms of the Simon classification. Simon uses the terms: "contraction," *con,* to join, to unite from different directions, and *traction,* to pull out, to pull toward; "distraction," *dis,* to

separate, violent or forced division in distinct directions; "attraction," *a,* to bring near, to unite; "abstraction," *abs,* to separate outward, to disarticulate; "protraction," *pro,* in front of; "retraction," *retro,* back. These terms are used to express the deviations in relation with the three planes, of a part or

Fig. 4.—Upper and lower alveolar prognathism—the upper and lower alveolar processes are deviated forward in relation to the body of the jaws.

all of a jaw, the teeth and the dental arches, and may be mandibular, alveolar, dental, anterior, posterior, unilateral, or bilateral.

This nomenclature is inadequate because the root used, *traction* (to pull out, to pull toward), has a pathogenic meaning which does not correspond with the

reality, neither does it give us the place of the anomaly. The other roots, *con,* to join, *dis,* to separate, *a,* to attract, *abs,* to separate, *pro,* in front, *retro,* back, designate the nature or class of the deviation. But these few words are used to designate so many deviations of teeth, jaws, and dental arches that they do not give us a clear idea of the anomaly described.

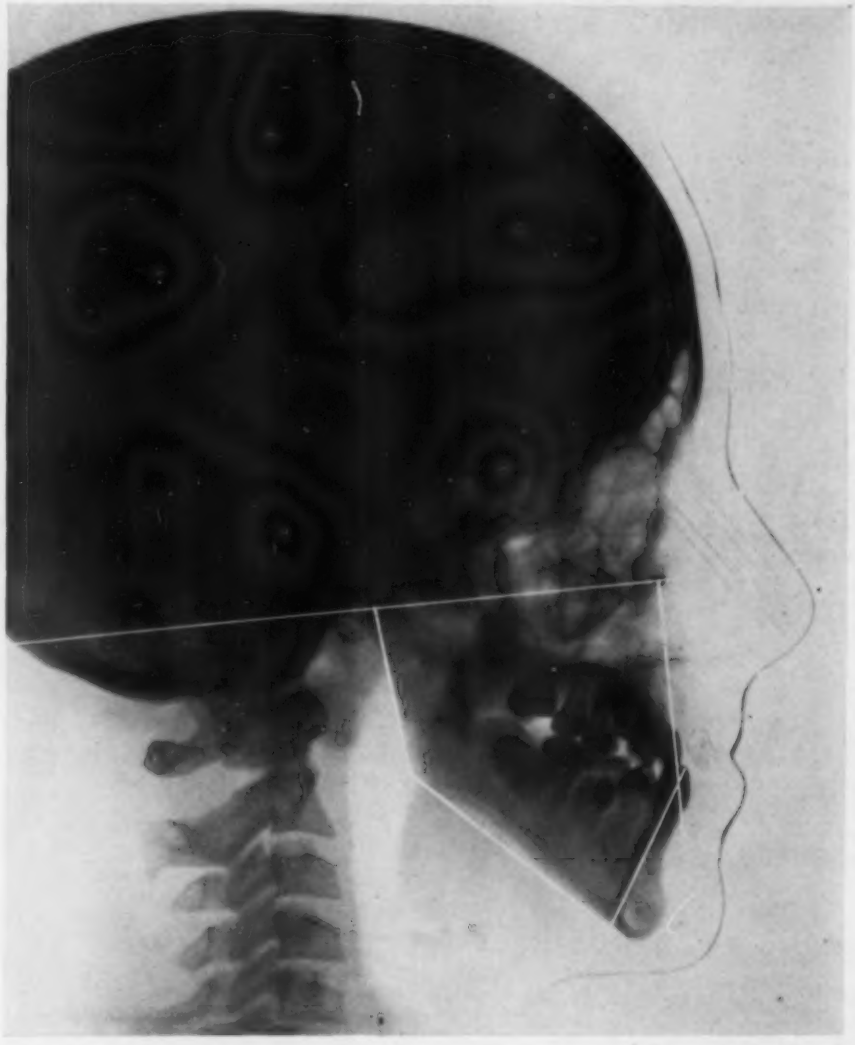

Fig. 5.—Upper anteroposterior micrognathism—the maxilla is smaller than normal in anteroposterior direction.

To give a practical example of the thorough and clearer knowledge of the clinical case using these rules of nomenclature and the classification, we can use a very well-known picture, taken from the book, *Practical Orthodontia,* by Dewey and Anderson (Fig. 10). The illustration on the left, according to Simon must be described: Maxillary total alveolar protraction. The mandible and teeth are in satisfactory position. Mandibular incisal attraction.

Description of the same case: *Group I.* Anamolies of the soft parts; upper procheilia (upper lip more in front than normal). *Group II.* Anomalies of the jaws. Upper total and alveolar prognathism (the body of the maxilla is deviated forward and the alveolar process is deviated forward in relation with

Fig. 6.—Lower anteroposterior micrognathism—the mandible is smaller than normal in anteroposterior direction.

the body of the maxilla). *Group III.* Anomalies of the teeth. Labiogression of the upper incisors (these teeth are located in front of their normal position in the dental arch). Mesiogression of the upper canines, premolars, and molars (situated mesially from the normal). Egression of the lower incisors (situated

outside the body of the jaw). *Group IV.* Anomalies of the temporomandibular joints. None. *Group V.* Anomalies of occlusion. Labioclusion of the upper incisors. Mesioclusion of the upper canines, premolars, and molars. Hyperoclusion of the lower incisors (passing the plane of oclusion). Angle Class II, Division 1.

Fig. 7.—Upper and lower anteroposterior macrognathism—both jaws are larger than normal in anteroposterior direction.

The middle illustration according to Simon was: Maxillary incisal protraction (partly alveolar). Mandibular alveolar retraction. Maxillary incisal abstraction.

Description of the same case: *Group I.* Anomalies of the soft parts. Upper procheilia (upper lip more in front than normal). Lower microcheilia (small lower lip) Microstomia (small oral orifice). *Group II.* Anomalies of the jaws. Upper alveolar prognathism (the maxillary alveolar process with its teeth is

Fig. 8.—Upper and lower vertical macrognathism—both jaws are larger than normal in vertical direction.

deviated forward). Lower alveolar retrognathism (the mandibular alveolar process, with its teeth, is deviated backward). *Group III.* Anomalies of the teeth. Labiogression of the upper incisors (these teeth are located in front of their normal position in the dental arch). Linguogression of the lower incisors

(these teeth are located behind their normal position in the dental arch). Distogression of the lower canines, premolars, and molars (these teeth are situated distally in the dental arch). Egression of the upper incisors (situated outside the body of the jaw). *Group IV.* Anomalies of the temporomandibular joints. None. *Group V.* Anomalies of the occlusion. Distoclusion of the lower canines, premolars, and molars. Hyperoclusion of the upper incisors (passing the plane of occlusion). Angle Class II, Division 1.

Fig. 9.—Vertical micrognathism of the ramus—the mandibular ramus is smaller than normal in vertical direction.

The illustration on the right according to Simon was: Maxillary incisal protraction (only dental). Mandibular retraction. Maxillary incisal abstraction. Mandibular incisal attraction.

Description of the same case: *Group I.* Anomalies of the soft parts. Upper procheilia (upper lip more in front than normal). Lower retrocheilia (lower lip behind normal position). *Group II.* Anomalies of the jaws. Lower total retrognathism (the mandible is deviated backward). Upper alveolar prognathism (the maxillary alveolar part with its teeth is deviated forward). Lower anteroposterior micrognathism (the size of the mandible is smaller than normal in anteroposterior direction). Hypergonia (increase in the size of the gonial angle). *Group III.* Anomalies of the teeth. Labiogression and egression of the upper incisors (these teeth are located in front of and outside the normal position in the dental arch). Egression of the lower incisors (situated outside the body of the jaw). Labioversion of the upper incisors (inclined toward the lip). *Group IV.* Anomalies of the temporomandibular joints. Possible retrocondylism (backward deviation of the condyles) the profile roentgenogram will permit in this case the differential diagnosis between retrocondylism and anteroposterior micrognathism, the two outstanding causes of total lower retrognathism. *Group V.* Anomalies of occlusion. Hyperocclusion of the upper and lower incisors (passing the plane of occlusion). Labioclusion of the upper incisors. Linguoclusion of the lower incisors. Distoclusion of the lower canines, premolars, and molars. Angle Class II, Division 1.

Fig. 10.

A thorough knowledge of these cases and a detailed description of the anomalies, with an appropriate nomenclature is thus obtained. The names of each anomaly gives us the place and the nature of the deviation from normal.

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THE INFLUENCE OF RECENT RESEARCH ON THE PRESENT ETIOLOGICAL CONCEPT OF MALOCCLUSION

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IT HAS been said that facts are the raw materials of progress. This paper is concerned with recent research and an improved concept pertaining to the etiology of malocclusion. One cannot review modern scientific study or observe the established facts of outstanding research bearing upon the causes of malocclusion without a profound respect for the honest and sincere men who have sought to reveal the true etiological factors of malocclusion. Few conclusions have been soundly established, but the work has led to important findings which are of great value in treatment planning. They give us the hope that earnest workers will continue their splendid efforts to establish more conclusive proofs and thus provide a more satisfactory foundation to our concept of the etiology of malocclusion.

There are many dentists who, in attempting to render a helpful service, do not remotely understand the basic growth problems and complex etiological factors of malocclusion. With them may be grouped an amazing number of orthodontists who adhere to the very limited concepts of long-outmoded principles. These sincere but misguided dentists neither recognize nor accept recent research findings and stubbornly refuse to follow the newer concepts now available for a more perfect service. On the other hand, there are those energetic enthusiasts who "manufacture" an advanced concept that is beyond the bounds of reason or convincing clinical experience. This has resulted in an alarming confusion which calls for a serious attempt on the part of orthodontists to encourage the application of sound principles in a unified approach to the etiology of malocclusion.

Recent research has made available a more hopeful understanding of the etiology of malocclusion and has vividly portrayed a far more satisfactory concept, bringing greater assurance for successful and lasting results following treatment. The fund of knowledge has been increased by the careful and painstaking studies of eminent scientific men who have made bold advances in search of solutions to orthodontic problems. It is necessary to advance into this enlightened era, discard the old, narrow, and discouraging boundaries, and look to new horizons for improvement in our entire approach to problems of case analysis and treatment. Our present-day concept of the etiology of malocclusion is based on recent research of the most careful and accurate studies by distinguished scholars. This newer knowledge is available for clinical application.

It seems incredible that orthodontists, professional specialists who should recognize their problems as basically biologic in character, appear to ignore

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the well-established facts of past studies and experience on the one hand, and the revelation of newer principles on the other. Our problems are so overwhelmingly biologic in character that it is impossible to overlook the greatest factor, heredity, and its important supplements, variation and function.

It is universally accepted that orthodontics is fundamentally concerned with the problem of growth and development, and that the character of this problem involves a recognition of every factor which might in any way interfere with normal or optimal maturation of the structures with which we are concerned. We, therefore, face facts which, in their solution, take us deeply into the field of genetics. We must apply the findings in this field to the science of orthodontics if we would recognize hereditary factors as possible causes of malocclusion. Some rather startling revelations have been made available to us which may prove useful in our study of individual cases. In the light of these newer developments, we can hardly expect that the beautiful growth pattern, which at one time was believed to be the heritage of every individual, can be ideally expressed in the growth and development of the average child. There is reason to believe that an inherited complex, due to the shifting of genes from chromosome to chromosome, may be such an unbalancing factor as to affect greatly the growth pattern with the result that certain types of malocclusion are indigenous to such individuals. Byron Hughes stated his impressions regarding the variations which concern the orthodontist and his problems, when he wrote: "Nature is concerned with the welfare of each of the genes but does not provide an administrative system or an executive to keep these genes cooperating with each other to maintain the welfare of the individual."[1]

There are three factors in growth and development, that is, three forces of mutual action, namely, heredity, environment, and function. With an optimum determination, life is a balance of these forces. "The entire organism develops out of the germ and the organization of the germ determines all the possibilities of development, the actual realization of any possibility is dependent upon environmental stimuli."[2] Hence, the development may be characterized by physical, physiologic, metabolic, neurotic, or psychic aberrations. At no time in the life of an individual do heredity and environment operate alone.

Structural indefectives among living things have long been recognized by biologists who have noted that these differences are expressed in many ways, describing them as variations. These variations were originally regarded as imperfections but it is now quite evident that variation is one of the most universal characteristics of living organisms. Variation which affects one part may influence other parts, and by the same token function may also be affected. Using this approach to the problems of malocclusion, it would appear that they may be very largely influenced by heredity and environment, or nurture, and that these factors may account for some of the mystifying variations. The research conducted at the Cornell University Medical School, under the direction of Charles R. Stockard, is of genuine interest to orthodontists. Dr. A. Leroy Johnson contributed to this study.[3] Johnson, referring to the results of this study, said, ". . . . the hybrid individual descending from two stocks with different lengths or types of jaws may inherit the upper jaw from one stock

in association with the different type lower jaw from the other stock. In all probability this is equally as true for the race hybrids of man."[4] In commenting upon this statement, Dr. Robert H. W. Strang stated, "If this is true in man, then there is the possibility that there are separate genes controlling the size and form of the maxillae and mandible, and perhaps for tooth size and form, making it possible for the child to inherit the jaw or jaws of one parent and the teeth of the other."[5] Remarking on this outstanding study in the field of animal biology, Wendell L. Wylie stated, "No matter to what degree I admire the resourcefulness and thoroughness which mark this study by Stockard and his associates, my own knowledge of orthodontic anomalies will not permit me to accept interpretations made with regard to human malocclusion."[6] There also seems to be ample reason for the orthodontic group carefully to observe and record clinical findings concerning the influence of the endocrines upon growth and development of the dental and associated structures. Every orthodontist of long experience has seen numerous cases of similar familial malocclusions which are of unquestioned hereditary origin, with evidence of endocrine dysfunction. The Stockard studies should stimulate further research in this particular field and increase our understanding of the causative factors of malocclusion. Bear in mind three important considerations, suggested by Johnson, in the analysis of every case of malocclusion:

I. Are certain peculiar structural formations of genetic origin, and if so to what extent can they be modified?
II. Do all cases possess equal potentialities of development?
III. The typical is our guide in the study of occlusion. To what extent shall we try to produce it in the individual?

In his monumental study of the etiology of malocclusion, Brash concluded that, "The main question is whether inheritance or environment, nature or nurture, the genetic constitution or the physiological or pathological conditions or factors in control of growth, are responsible in a broad way for malocclusion and irregularities of the teeth."[7] Primarily, orthodontics is concerned with the growth and development of the face and jaws. Developmental disharmonies and environmental influences affect the growth pattern and the importance of these factors, known and unknown, are the basis for continued study and research.

Recent findings pertaining to bone growth have revealed facts of great importance to the orthodontist. Growth of the maxilla contrasts greatly with the growth of the mandible. "The more important sites of growth for the maxillary composite are three sutures on each side: (1) the frontomaxillary suture between the frontal bone and the frontal process of the maxilla; (2) the zygomaticomaxillary suture between the maxilla and the zygomatic bone (and secondarily, the zygomaticotemporal suture in the zygomatic arch); and (3) the pterygopalatin suture between the pterygoid process of the sphenoid bone and the pyramidal process of the palatine bone. It is significant that these three sutures are parallel to each other and are all directed from above and anteriorly downward and posteriorly."[8] This suture growth has direct bearing upon and strongly supports the findings revealed to us some years ago by the late Milo Hellman to which reference will be made later.

Sicher has finally exploded a too long prevalent idea concerning the interstitial growth of bone. "Interstitial growth of bone does not exist and this statement is unqualified and unequivocal."[9] Sicher has furnished a most important revelation in this statement. In other words, all bone growth is surface growth. Hence, basal (or foundation) bone cannot be enlarged by forces of mastication. Only the quality and form of the alveolar process is affected by these functional forces. It is, therefore, hopeless to expect a denture, enlarged by general expansion subsequently to produce a larger bony base as a result of functional stress because such forces do not influence surface growth. Sicher has presented us with a definite appraisal of the mandible. This interpretation is highly important to orthodontists. He stated that, "In the young individual the bony part of the mandibular condyle is overlaid by a cap of cartilage, but this in turn is covered by a thick layer of connective tissue which continues into the periosteum of the mandibular neck. There is an interstitial growth of cartilage but in the mandibular condyle the cartilage grows by interstitial proliferation and by apposition from the deepest layers of the covering fibrous tissue. In addition to growth of cartilage and its replacement by bone, bone tissue itself is laid down at the posterior border of the ramus, at the upper border of the coronoid process, and at the alveolar crest. The mandibular body grows very little by apposition on its lower borders. It grows in height by addition of bone on the free borders of the alveolar process. At the same time, at the anterior border of the ramus, bone is resorbed so that room is provided for the successive eruption of all the teeth.[8]

Recent research has been directed toward definite recognition of the possible causes of malocclusion so clearly stated by Brash: ". . . . inheritance or environment, genetic constitution, or physiological or pathological factors in control of growth." It is evident that causes vary in each individual case. However apparent may be the structural deficiencies which are evident in malocclusion, the complex problem in the search for the specific cause or causes requires a sound understanding of every factor or influence affecting the growth pattern.

The functional forces influencing the maxillary structures have not been uniformly considered in the broad study of malocclusion. It is well known that function of parts has a tremendous influence in the form of structures. It has been recognized from the days when Angle set forth his concept of malocclusion (which marked the beginning of modern orthodontics) that the forces of occlusion were significant, and that these forces, working normally or abnormally, influenced tooth positioning. It appears that Strang has done much (in his presentation of the forces of occlusion as related to growth and development) to clarify the concept that these influences play an important part in the functional adaptation of the structures involved in malocclusion. Strang ably portrayed the tremendous action of bone growth emanating in the sutures surrounding the great bony buttress of the sphenoid bone, the known growth centers in the maxillary complex, and also the unusual growth and development of the mandible. His analysis of the influence of muscular forces —this fine balancing of function of the muscles of mastication and expression

with the forward growth urge and functional adaptation of the osseous structures—revealed the necessity of perfect balance of all these factors if form and function are to produce structures which will provide the foundation upon which normal occlusion can be established by the erupting teeth. Too long have we neglected consideration of the influence of the muscle forces. Too long have we failed to recognize that in every case of malocclusion, the product or sum total of inheritance, environment, genetic constitution, physiologic or pathologic conditions and every factor influencing growth and development have produced a result in the individual's dentition which actually is a balance of all these forces. The error may be in the hereditary deficiency of the supporting structures. There may be acquired influences or environmental factors that inhibit the realization of the optimum growth and development essential for perfect occlusion. Nevertheless, these forces—some normal and some abnormal—finally produce a balance and that balance in its adjustment produces a malocclusion.

Through many years—very productive years—our great friend and research authority, Milo Hellman, made a tremendous contribution to our knowledge concerning the growth and development of the face and the etiology of malocclusion. It is significant that the studies of Brodie, Broadbent, and Sicher bring added proof to all the findings Hellman revealed in his many studies of growth and dentition, Hellman analyzed the many and varied growth changes taking place in the maxillary complex. He believed that the growth changes associated with dentition and the development of the face involved a change in form. His postulates revealed that as the face grows there is a change in proportion, and these growth forces, acting reciprocally, effect an adjustment in position; that the two directions of growth chiefly concerned in this adjustment of the face are those of height and depth. Particularly in Sicher's work do we find similar convictions as to changes during growth and development in the bones of the face. Hellman brought to us years ago a true picture of these transitional changes associated with the developing dentition. He was convinced that in the development of the dentition the upper and lower portions of the face were wedged apart, bringing additional height to the face. The face grows wider, spreading out laterally with the greater increase posteriorly, particularly in the region of the mandibular angle. The depth of the face is acquired by increments from behind—it really grows backward to accommodate the permanent molars as they erupt. At the same time, the entire facial mask swings forward, the change being greater in the chin region than in the nasal portion. As the face continues to develop, different parts grow at different rates and with the addition of each molar there is an accompanying increase in the size of the jaws and a forward adjustment of the entire face.[9]

Sicher refined Hellman's finding in facial growth and tooth eruption. He also observed, "that the development of the teeth and that of the jaws are highly independent. It is true that the development and growth of the alveolar processes are dependent on the development and eruption of the teeth."[8] Elaborating upon the dependence of bone growth and development of the teeth, Sicher continued, "The influence of the growth of the facial skeleton upon the

eruption of teeth is threefold: (1) The growth of the maxilla and mandible, in an antero-posterior direction, provides the space necessary for the successive eruption of the posterior teeth. (2) The growth of the maxilla and mandible in height, initiated by the vertical growth of the mandibular ramus, is necessary for the free vertical eruption of the teeth. (3) Growth of bone in the maxilla and mandible is one of the forces of eruption."[8] The alveolar process undergoes change during the shedding of the deciduous teeth and eruption of the permanent successors. There is a vertical growth of the alveolar process. This change is not an adaptation of the deciduous arch to accommodate the permanent teeth, but "an entirely new formation with a typical shape adjusted to the permanent dentition."[8] It is very revealing to pursue these many studies that we may properly evaluate all the forces and factors which bear upon malocclusion. It is, for instance, important that this whole problem of growth and development and the forces of eruption be thoroughly studied and carefully correlated with every case under consideration for analysis. Hellman adopted developmental stages, based upon patterns of dentition attained during certain periods, correlating developmental changes of the dentition with facial growth. These stages extend from early infancy to the period of senility. Certain stages extend over periods of greatest change, periods of loss of deciduous teeth and appearance of the permanent dentition. One can anticipate the maximum growth period and foresee the period during which orthodontic assistance can more quickly establish the most desirable occlusion.[10]

Broadbent revealed some exceedingly valuable findings in his serial roentgenograms to establish facial growth patterns and to disclose early alterations of form and structural changes of the face. By means of his studies, it is possible to estimate the growth and facial development of children.[11] Brodie has contributed much to the sum of our knowledge concerning facial growth and the developing dentition. His conclusions concerning the constancy of the mandibular angle and the fact that growth patterns show progress along parallel lines harmonize with the convictions of other recognized research workers (Sicher, Broadbent, Hellman).[12]

All these noteworthy findings (and many others worthy of consideration in this paper which must be omitted because of limited time) indicate a compelling desire on the part of our group of specialists to solve the etiological problems of malocclusion. Recent research has been tremendously helpful in establishing a more improved method of study for case analysis. Furthermore, present-day concepts of the causes of malocclusion have resulted in trends which are greatly at variance with many past beliefs, and are sometimes so far-reaching that the approach to treatment is entirely changed.

The integrity of the dental units (the teeth) has been a universal principle in orthodontics since the days of Dr. Angle. For over fifty years, the universal acceptance of this concept dominated the thinking and action of the dental profession. Perhaps no one factor was responsible for so many failures among honest and conscientious orthodontists. This precept has discouraged many sincere men and dismayed the parents of many little patients who an-

ticipated lasting results from our orthodontic efforts. It is only natural, therefore, that changing trends of orthodontic thought and progress should produce a better understanding of the etiology of malocclusion and reveal some of the causes of failures as well as the limitations of treatment which have so greatly affected results in the past.

After years of continued or intermittent treatment, one cannot honestly accept failure in securing ideal functional occlusion with the explanation that the embarrassing end result is normal for that individual. No! Back of this complex problem were genetic factors, inherent limitations, environmental influences, and limits of tolerance of the structures which in themselves established a natural balance of all component parts and forces, thus making, or tending to make, an individual normal. That these limitations appear to have ruled out the integrity of thirty-two teeth in the dental pattern of many cases of malocclusion must be considered very seriously. The elimination of any of the dental units cannot honestly be done without first arriving at a studied analysis of each case. Only upon such an analysis can a corrective plan be evolved which will assure lasting and permanent results after careful and conscientious orthodontic treatment. The routine elimination of one or more teeth for every patient presented for orthodontic treatment is damaging not only to the practice of orthodontics but to all of dentistry, and is as reprehensible a concept as was Angle's original precept of the integrity of the thirty-two teeth. Progress is limited and has always been limited by the dogmas which have been based upon the fads or fancies of past decades only to be refuted by newer knowledge and by the wisdom which comes with convincing clinical experience.

Our orthodontic literature is filled with newer trends or methods of treatment. These expressions of enthusiasm will fade and die, but from all these reported findings will come a lasting conviction that the search for the underlying causes of malocclusion must be our greatest endeavor. The most acceptable advances in the treatment of malocclusion have been based upon some very sound and acceptable studies. In some instances, the lasting results speak more convincingly of the products of the research rather than the methods employed in treatment. Why? Because the products of research continue to add to the fund of knowledge of the growing child and will continue to augment such knowledge. Methods of treatment are man-made and will change as our knowledge of growth and development improves.

It is difficult for some to harmonize the newer beliefs, as expressed by a rapidly growing school of thought, with the principle that there is an inherent force within the bony structures which, by orthodontic stimulation, will "produce" sufficient bone to support thirty-two teeth in any and all jaws. It is quite obvious that there are two very important and fundamental facts that are either unknown by the majority of orthodontists or deliberately ignored. These two facts must be recognized in the etiological appraisal and case analysis of every case of malocclusion. They are:

I. "No growth takes place in the body of the mandible and maxillae anterior to the first permanent molars after their eruption and this is the area

to which orthodontic treatment is limited in the movement of individual teeth. Nothing can be done to harmonize the bony foundation with the excessive amount of tooth material if the tooth pattern is not in harmony with the bone growth in this area.

II. "All bone growth occurs by surface additions and not by growth within the bone, pushing the compact surface layers outward. Functional stimulation, subsequent to expanding a denture, cannot enlarge the basal bone for masticatory stress is received within the bone and tends only to strengthen those bone trabeculae that resist this thrusting force."[13]

There will come a day when the classical studies of Hays Nance will mark the beginning of a better concept of our problems and the methods to be employed in meeting these problems. Dr. Nance can be classed among our most sincere and thorough students of orthodontic problems. His studies furnish some of the most important highlights in the entire field of orthodontic research, for he has related careful research studies to treatment and has secured lasting results. This paper is not concerned with treatment but does recognize that specific findings bring improvement to orthodontics if the newer concepts add stability to the dentition following an honest effort to establish a pleasing, esthetic, and functional occlusion within the structural limitations of inheritance, environment, and functional adaptation. Dr. Nance has convincingly shown that stability of the dentition is dependent upon the correct positioning of the teeth over foundation bone; that the correction of any and all cases of malocclusion is not the result of stimulating bone growth but depends rather upon an accurate appraisal of the amount of bone available and the movement of the teeth into their proper relation in each arch and into perfect occlusion, even though the bony structure is so limited in quantity that the elimination of some of the teeth may be necessary to assure lasting results.[14] The most satisfying and revealing results will be secured if Dr. Nance's suggestions are followed in the analysis of each case of malocclusion.

While this paper has largely considered the complex problems associated with malocclusion in which marked aberrations are present, it is well known that many cases presented for orthodontic treatment possess adequate bone substance to accommodate the tooth structure present. The correction of simple malocclusion is not easy, and the correction of the more complex cases is extremely difficult. One is thoroughly convinced that it takes far more courage to overexpand in an effort to gain space for malposed teeth, where basal bone area is insufficient, than to subtract tooth substance. Remembering this important fact will assure far more satisfying results after careful case analysis and treatment planning.

SUMMARY

Recent research has had a most favorable influence upon our concept as to the causes of malocclusion. In fact, our present concept assures a more adequate understanding of our problems and gives us a more positive approach to case analysis and treatment planning. The most noteworthy results of

recent research, concerning the structures of the face and jaws, may be summarized as follows:

1. Interstitial bone growth does not exist. Growth of cartilage in the mandibular condyle does occur by interstitial proliferation and by apposition from the deepest layers of the covering fibrous tissue.

2. At no time in the life of an individual do heredity and environment operate alone.

3. All the inherent factors and environmental influences must be maintained in perfect and normal balance for the normal development of occlusion.

4. Growth of bone in the maxilla and mandible is one of the forces of eruption.

5. The present concept discards Dr. Angle's postulate concerning the integrity of the thirty-two teeth in many cases of malocclusion.

6. No growth takes place in the body of the mandible anterior to the first molars after their eruption.

7. All bone growth occurs by surface addition. Orthodontic therapy will not stimulate bone growth.

8. Stability of the dentition is dependent upon correct positioning of the teeth over foundation bone.

9. Permanent and lasting results in establishing esthetic and functional occlusion depend upon the structural limitations of inheritance, environment, and functional adaptation.

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Editorial

Extraction of Teeth

"It will be seen that the cuspids are being retracted by means of the large traction screws, into the space from which the first bicuspids have been extracted."

REGARDLESS of what you may or may not think about the well-recorded maxims of Dr. Angle pertaining to the extraction of teeth as an adjunct in the correction of malocclusion, you may be surprised to know that the above paragraph is a quotation from the textbook, *The Angle System of Retention of the Teeth,* third edition, written in the year 1892. Dr. Angle, at the time the book was written, was Professor of Histology, Orthodontia, and Comparative Anatomy of Teeth, in the Dental Department of the University of Minnesota, Minneapolis, Minnesota.

If the above quotation from Dr. Angle's textbook interests you, thumb further through the third edition and you will find the following: "The nuts were tightened every third day, moving the teeth out as far as desired in about three weeks. While this was being done, the lower jaw was being acted upon, the lower incisors and cuspids were moved backwards until the cuspids occupied the space from which the bicuspids had been removed, as shown."

Notwithstanding the fact that Dr. Angle thoroughly indoctrinated his students in subsequent years with unmitigated intolerance toward the practice of the extraction of children's teeth for corrections of malocclusion, the above makes it clear that he did not hold that view in his earlier years of practice and teaching. Dr. Angle was obviously advocating a compromise extraction treatment fundamentally little different than what is being zealously advocated by some orthodontic groups at the present time.

If you really want to get into the background and history of this traditional and interesting controversy and get the news behind the news story, turn to "The Questions of Extraction in Orthodontia," by Calvin S. Case, M.D., D.D.S., Chicago, Illinois, with discussion by Dr. Cryer, Dr. Dewey, Dr. Buckley, Dr. Farris, Dr. Hinman, and Dr. Bowman. (Your dental school library may have it.) This will provide several evenings of interesting reading. It is recorded in *Transactions of the Old National Dental Association,* for 1911, and from *The Dental Cosmos,* for February, March, September, 1912, and January, 1913.

Dr. Case obviously quite conservatively advocated the extraction of teeth occasionally as a procedure in the correction of malocclusion, particularly what he called bimaxillary protrusions. However, in that opionion, at that time, he stood pretty much alone. Against him were arraigned practically all of the best orthodontic minds and talent of that day. He exhibited by means of lan-

tern slides case after case in which the upper first premolars had been extracted, and, in so far as tooth alignment was concerned, he plainly revealed the results of his treatment as highly satisfactory. You sense, from reading the not too courteous discussions of the members of the new school of that day, who opposed him, that they felt what he was actually doing, in some cases at least, was dispatching the "straightening teeth" job entirely oblivious of the biologic manifestations that take place in the maxillary and facial bones over the period of adult life. In a word, they felt that Dr. Case was correcting malocclusion by extracting teeth, but at the same time was setting the stage for another deformity not so apparent to the eye in adolescence, but which might well manifest itself markedly later in life as a result of an arrested growth of the maxilla. A few have survived in orthodontic practice long enough to have lived through two extraction controversies. The Case extraction wave, early in the century, and the so-called Tweed trend, in the middle of the same century, have been experienced by but few who are now practicing.

In retrospect, it seems not unlike many things that are new and advocated with profound zeal and sincerity. The pendulum first swings too far to the right, then starts back, which is now plainly taking place in the extraction wave. There can be but little doubt of this in the minds of those who follow orthodontic trends.

Perhaps a good way to solve your own individual extraction problems, while the traditional leveling off process is taking place, is to pay less attention to complex diagnostic aids and rule book approaches, and to take a careful down-to-earth viewpoint of your patient's problem through the patient's eyes. Presume for the time, for instance, that the patient is your own daughter between the ages of 11 and 16. Ask yourself, "If I extract four premolars for her, will I be happy about it when she is 16, and will I still be entirely happy about it when she is 40?" If the answer to that question is yes now, and is still yes a month from now, you are probably justified in the extraction of some teeth in the correction of a malocclusion because you are fully convinced that there is too much tooth structure. In any event, read the discussions of thirty-five years ago about extraction of teeth, in which everything was injected into the fray, from the breeding of thoroughbred race horses to the fertilization of the chromosomes that created the prize-winning Lancashire hog of 1767 in England, and you will be impressed again with the truth of the old saying that history repeats itself and that extraction of teeth in the treatment of malocclusion far antedated the full complement of teeth theory.

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Orthodontics in Relation to General Dentistry: By J. H. Hovell, L.R.C.P., M.R.C.S., L.D.S., *Brit. D. J.* **83**: 71-75, Aug. 15, 1947.

A knowledge of orthodontics is an essential part of general dental surgery. While it is an undoubted fact that the diagnosis and treatment of many cases is a matter solely in the province of a specialist, orthodontic prophylaxis and the early recognition of developing malocclusion is also solely in the hands of the general practitioner.

It is not disputed that by means of fixed appliances in the hands of an expert it is possible to perform incredible tooth movements, and to produce an occlusion of the teeth which on examination of the models appears to be perfect. The charge is frequently leveled against orthodontists, however, that these apparently perfect treated cases are not, in fact, perfect. A large number of them relapse, some immediately upon removal of retaining appliances, however long worn, others later.

Many adult malocclusions can be prevented by adequate conservative treatment of the deciduous dentition. Conservation of deciduous teeth, apart from preserving them for masticatory purposes, is valuable orthodontic treatment. It is very seldom that early loss of deciduous molars is not followed by closure of the spaces to some degree. This closure may be due to forward drift, tilting, and rotation of the first permanent molars, or it may be on account of the lingual collapse of the lower incisors. In the latter case, a close bite results with its attendant ill effects upon the health of the mouth. Not only this, but the lower arch having collapsed, the upper arch collapses also with consequent malalignment of the upper teeth.

Early deformities of the arches due to habits should be observed, and efforts should be made to check the habit. In this class, it is cases of thumb-sucking with which we are most often confronted. In my opinion, any method savoring of compulsion must be absolutely avoided. Because the teeth are moved into a position in which they are no longer stable within the oral musculature, they relapse quickly into their correct positions when the habit is broken. Most children, correctly tackled, are intelligent and cooperative patients—far more so, in fact, than the average parent.

The next stage is to present the child with a vulcanite or acrylic plate covering the palate, explaining that this is to help him to realize when he is sucking his thumb, and thus assist him in his efforts to stop. Obstinate cases will invariably respond to an Andresen appliance which has to be bitten or sucked into place, thus providing an alternative to the thumb, and which, at the same time, prevents ingress of the thumb into the mouth. This appliance can also be constructed so as to rectify any deformity already produced.

Early recognition of noneruption of misplaced teeth, particularly upper canines, in an otherwise normal arch, enables simple surgical treatment to facilitate the eruption of these teeth to be carried out. Supernumeraries in the upper

incisor region may cause a severe malalignment of the teeth. If the cause is recognized sufficiently early, and the supernumeraries removed, the malposition of the incisors may be completely rectified without any further treatment being necessary.

In dealing with teeth which are malformed, either congenitally or through trauma during the period of their development, the orthodontist must know all modern methods of tooth restoration and replacement. Otherwise, he is not able to decide whether a malformed incisor can be moved into such a position in the arch that a jacket crown can later be fitted successfully or whether it had better be removed.

Unfortunately, construction of partial dentures is frequently made difficult by drifting of the remaining teeth with malocclusion, and food packing in the resulting spaces. Teeth upon which it is desired to place occlusal rests may be so tilted that they cannot even bear normal masticatory stresses, far less the additional ones entailed by such a procedure. Here, again, the orthodontist can play his part by moving back these teeth into correct position.

The commonest sites in which traumatic occlusion arises are the upper and lower incisor and canine regions and the lower molar region. Excessive overbite causes locking of the incisors and canines during lateral and protrusive movements of the jaws, and early loss of deciduous molars produces tilting forward from their correct axial inclination of the lower molars. The reason why upper molars are not so frequently affected is that their forward movement after loss of deciduous molars is accompanied by more rotation than tilting.

Clinical evidence is the early occurrence of localized gingivitis around teeth in traumatic occlusion. This is frequently seen in children with good oral hygiene when the rest of the gingival margin is perfectly healthy, and inevitably clears up with no other than correct orthodontic treatment.

In almost 100 per cent of modern British jaws there is insufficient bony tissue to act as foundation to the amount of dental tissue present. That is to say, there is a disproportion between the size of the apical base and of the teeth. This disproportion is greatest in the anteroposterior direction as the human face has become less prognathous more rapidly than the teeth have become reduced in size.

The next step in rectifying the occlusion is to check the lateral and protrusive movements. It is noticeable that if the finger is laid gently along the teeth, those teeth which are later shown to be in traumatic occlusion by the articulating paper can be felt to move, often very considerably, during the excursions of the jaw.

The teeth whose occlusion is found to be most faulty during these movements are the incisors and canines, due to the excessive overbite so frequently present.

In normal occlusion and positioning of the teeth, these are so arranged that the stresses of mastication are directed along their long axes, and are so positioned upon the apical bases that internal and external alveolar plates divide equally those stresses. The periodontal membrane and supporting bone are designed mainly to support stresses in this vertical direction, but can also react to increased lateral stresses, and it is only when these are excessive or tissue resistance is reduced by some other factor, endogenous or exogenous, that they break down and parodontal disease commences.

Tilting of the teeth is the cause of the masticatory forces no longer being directed along their long axes. This tilting can be produced in three main ways: First, and most easily recognized, is the forward tilting of the lower molars, and backward inclination of lower incisors due to the early loss of

deciduous teeth. Second is the tilting of the teeth which occurs when the arches as a whole are misplaced upon the apical bases. This is not obvious unless of a considerable degree, and can often be diagnosed only by accurate standardized lateral radiographs.

In addition to the distomesial tilting of the cheek teeth when the upper dentition moves forward, the upper incisors may, as has been previously stated, become proclineated. Within certain limits, the alveolar process will adapt itself to abnormal positions of the teeth, and in such a case the incisors do not tilt through the alveolar bone, but the latter is molded over their roots. This bone, standing out from the apical base, is not, however, able to sustain masticatory stresses with the same efficiency as when normally placed. In addition, owing to the tilting of the teeth, a much greater than normal proportion of these stresses has to be borne by the outer alveolar plate. Alveolar resorption in such a case will commence labially in the front of the mouth, and interdentally in the region of the cheek teeth, with lateral resorption in this area also if there is cuspal interference during masticatory movements.

The third cause of tilting of the teeth is incorrect orthodontic treatment. Extraction of teeth in the course of treatment, or as a sole method of treatment, frequently produces tilting of the remaining teeth whose full extent can be demonstrated only by radiographs.

For these reasons, extraction of teeth without rectification of incorrect axial inclinations of the remaining teeth by means of appliances is incorrect, and will inevitably predispose the mouth to dental disease. It is, therefore, not ideal orthodontic treatment.

Exclusion of the upper canines from the arch is always accompanied by a forward drift of the upper buccal segments and the tilting of all the upper cheek teeth. The time-honored procedure for the relief of this abnormality is once again the extraction of the upper first premolars. This is usually accompanied by extraction also of lower first premolars, as there is also a disparity between apical base and tooth tissue in the lower jaw. A result is often obtained which satisfies completely both the dentist and the parents—a satisfaction absolutely unjustified in view of the tilting of the teeth behind the first premolars, which, far from improving, has actually become worse. These teeth can, and should be, uprighted by orthodontic treatment.

Save in some instances, when one arch is narrow and the other wide, owing to a faulty position and action of the tongue, if the arches are too small to accommodate the teeth, this is secondary to the apical base itself being too small. Should the arches be expanded to obtain alignment of the incisors, this results in tilting of the cheek teeth in a buccal direction, an increased strain thus being thrown upon the buccal alveolar plate during mastication. Such of these cases that do not relapse inevitably develop parodontal disease at an early age.

It may be asked why in many cases with malocclusion disease does not arise until the fourth or even the fifth decade of life. The age at which this happens depends upon many factors; the severity of the traumatic occlusion, the general health of the patient, including normal metabolic and endocrine function, and all the varying factors which have been and are still blamed by many authorities for parodontal disease.

It is my contention that a great proportion of parodontal disease is primarily due to traumatic occlusion; that the first change in such parodontal disease is alveolar resorption; that apical migration of the epithelial attachment, pocketing, and deposition of serumal calculus are secondary to this alveolar resorption and not its cause.

A heavy burden is thus laid upon the orthodontist—far heavier than he has realized in the past. He is responsible not only for the appearance of his

patient and the efficient occlusion of the teeth, but also for the continued health of the parodontal tissues, whose health in turn is intimately bound up with the general health of the patient.

Orthodontie (Orthopédie Dento-Faciale): By G. Izard, Deuxième Édition Revue et Augmenteé, Paris, Masson et Cie, Éditeurs, 1943, pp. xv + 1189, with 1,153 illustrations.

This work was published immediately before the German occupation of France. It is one of a series of tomes on the practice of dentistry under the editorial direction of Dr. Chompret. In the first part of the book, Izard presents normal morphology and physiology. Here he discusses the question of normality as it pertains to orthodontics in general and to Simon's law of the canine, in particular. He concludes that the term "normal" should always be considered in the light of variations which fall within the optimum of function and esthetics. General growth standards as they apply in France, craniofacial morphology, and the various facial landmarks are presented.

Under "Preventive Orthodontics," the author discusses Willett's methods of cavity preparation in deciduous teeth, the use of space maintainers and mechanical restraining methods for breaking the child who sucks his thumb.

Tissue changes in orthodontic tooth movement are given due consideration. Many methods are discussed employing jackscrews, a method of treatment which has been discarded in America. The use of labial and lingual appliances is presented in great detail, and the construction of these appliances is fully illustrated. The Angle edgewise arch receives scant consideration, as does the subject of multiple appliance therapy in general.

An interesting chapter is presented on the movement of teeth without appliances, using instead the action of various types of ligatures. We are not aware of anyone using such procedure to any extent in America. It would seem worth while to test the efficacy of this method in actual practice. The so-called activators which allegedly use natural forces for moving teeth are discussed. One cannot help but think that the psychological make-up of the patient to be treated is an important factor in the choice of appliances after seeing the multiplicity of mechanical devices presented by Izard. Those who have a knowledge of the French language will find this book of great interest and practical usefulness. Even a perusal of the illustrations themselves by one who is not familiar with the language but, nevertheless, knows orthodontics will be found rewarding.

Practical Full Denture Prosthesis: By Joseph Simeon Landa, D.D.S., Clinical Professor of Dental Diagnosis, New York University College of Dentistry; Formerly Assistant Professor of Prosthetic Dentistry and Chief of Prosthetic Clinic, New York University College of Dentistry; Associate in Charge of Full Denture Prosthesis, New York Polyclinic Medical School and Hospital; Consulting Prosthodontist, Downtown Hospital; Associate in Charge of Denture Prosthesis, Beth-Israel Hospital. Brooklyn, Dental Items of Interest Publishing Company, Inc., 1947, pp. xv + 356, with 161 illustrations. Octavo. Price $9.50.

This is a mature volume on full denture prosthesis which will be of great practical value to the dentist and will provide basic information for students of dentistry. After reviewing the anatomic and physiologic considerations of the hard and soft parts of the jaws, Landa approaches mouth examination from the dynamic standpoint of the changes which take place in the edentulous patient after all the teeth are lost. These changes, as so many practicing dentists

have learned through sad experience, largely determine the success or failure of artificial dentures. Prognosis is stressed and the role of roentgenography in establishing prognosis is fully presented. Consideration is given also to such factors as nervous habits, age, social position, and intelligence of the patient. Many interesting illustrations are presented showing various anatomic areas and landmarks to be considered in taking impressions. Mucostatic and other negative pressure methods are discussed.

Landa discusses phases of full denture prosthesis which have been largely ignored in other words on this subject. For example, methods of coping with burning and dry mouth and gagging are considered.

Valuable information of a nontechnical nature, leading to successful denture service, is provided in a chapter on "trouble shooting." Specific questions are asked and answered which cover complaints presented by denture patients. "Many dentures," says Landa, "are mutilated by dentists in the process of aftercare because of over-eagerness to rid the patient of all his troubles at one time. It should be remembered by dentist and patient alike that the discomfort of initial experience with artificial teeth is a perfectly natural phenomenon."

Diagnosis and the planning of treatment in cleft palate cases is presented and fully illustrated. This book bespeaks the vast practical experience of the author and is unique among texts on denture prosthesis. A complete index is provided.

News and Notes

Essay Program of the Meeting of the American Association of Orthodontists

The program for the annual meeting of the American Association of Orthodontists held in the Neil House, Columbus, Ohio, April 26, 27, 28, and 29 is now completed. For your information we are herewith publishing the essay program of our meeting.

The program committee, under the chairmanship of Dr. George M. Anderson, has provided us with a comprehensive study of the various phases of an everyday practice of orthodontics.

Dr. Frederick Black, Chairman of Clinics, has provided approximately thirty-five clinicians. The clinics will be of a varied and informative nature. I am sure they will be of general interest to the profession. A complete listing of these clinics will appear in the March issue of the JOURNAL.

Rooms at the headquarters, Hotel Neil House, have been practically exhausted, but good reservations are still available at the Deshler-Wallick, one-half square away.

Deshler-Wallick Hotel

Neil House

You are respectfully asked to read the following information regarding the program. Please do so before you proceed further.

The past decade, because of the war, has been one of interference and confusion in professional life. Even so, the number of practicing orthodontists has continued to increase tremendously. It is our opinion that the American Association of Orthodontists is an organization well fitted to provide the opportunity for this group to refresh itself as to rational orthodontic procedures. The usual bringing together of disconnected papers does not seem, at this time, to answer that purpose.

We have, therefore, arranged what we term a coordinated program effort. Each paper is closely connected with the preceding one. The papers will be presented in a sequence comparable to the procedures we follow as we make plans to start and carry through to completion the treatment of an orthodontic patient.

First contacts with patients are for consultation; our first paper is a discussion of *"The Consultative Period."* Diagnosis logically follows, wherein we consider the *"type of case"*; our second paper is on that subject. At times, however, we can give advice that may prevent or lessen the need for actual treatment. It is, therefore, proper at this point to include a paper on *"The Prevention and Interception of Malocclusion."* During our detailed study of the prospective patient, the question of etiology assumes great importance.

We have arranged four papers to deal with that broad and complex field. The first, *"Oral and Environmental Conditions"*; the second, *"Radiographic Analysis"*; the third, *"General and Facial Development"*; the fourth, *"Psychological and Hereditary Factors."*

If, after full consideration of all the problems incident to the case up to this point, we come to the conclusion that actual therapy is advisable, *"Time as a factor in treatment planning"* has to be considered and *"The tissues involved and the changes which occur in them"* deserve our most careful thought. Our knowledge of *"The Fundamentals of Anchorage, Force, and Movement"* permits us to choose suitable technical procedures and use them according to individual peculiarities. *"Treatment Planning and Treated Cases"* provides a considerable group of reports of treated cases.

Since near the close of treatment we are faced with the problem of support for the improvement obtained, a consideration of *"retention"* then becomes essential.

The above is the lecture program for the Columbus meeting—in reality an outline of what transpires during *"the passage of a patient through an orthodontist's office."* We have, in this manner, considered in an orderly sequence and in considerable detail, the problems which are ours as we seek to provide a beneficial service to our patients.

The clinics on Thursday afternoon are of a nature to supplement much of the lecture program and of a character which should bring high credit to the orthodontic specialty.

Scientific Program*

Tuesday, April 27

9:00 A.M. Opening of meeting.
Invocation, Dr. Walter Sargeant.
Greetings.
Response, Lowrie J. Porter.

9:30 A.M. The Consultative Period. James D. McCoy, Beverly Hills, Calif.

10:30 A.M. Case Analysis, Indicated Types of Malocclusion. L. Bodine Higley, Iowa City, Iowa.

11:30 A.M. The Prevention and Interception of Malocclusion. J. A. Salzmann, New York, N. Y.

2:00 P.M. Oral and Environmental Conditions. John R. Thompson, Chicago, Ill.

3:00 P.M. Radiographic Analysis. William Simon, Chairman, Division of Oral Diagnosis, School of Dentistry, University of Minnesota, Minneapolis, Minn.

4:00 P.M. General and Facial Development. B. Holly Broadbent, Cleveland, Ohio.

8:15 P.M. The President's Address. Earl Jones, Columbus, Ohio.
The Ketcham Award.
The Research Award.

Wednesday, April 28

9:15 A.M. Psychological and Hereditary Factors. Byron O. Hughes, Ph.D., Professor of Child Development, School of Education, and Research Associate in Orthodontics, School of Dentistry, University of Michigan, Ann Arbor, Mich.

10:15 A.M. Age as a Factor in Treatment Planning. W. Wayne White, Kansas City, Mo.

11:15 A.M. The Tissues and Changes Involved in Tooth Movement. Myron S. Aisenberg, Professor of Oral Pathology, Baltimore College of Dental Surgery, Dental School, University of Maryland, Baltimore, Md.

2:00 P.M. The Fundamentals of Anchorage, Force, and Movement. A. C. Rohde, Milwaukee, Wis.

3:00 P.M. Treatment Planning and Treated Cases. Ashley Howes, New York, N. Y.

4:00 P.M. Executive Session.

*Developed around the theme, *the passage of a patient through an orthodontist's office.*

Thursday, April 29

9:15 A.M.	Treatment Planning and Treated Cases.	William M. Jarrett, Charleston, W. Va.
9:45 A.M.	Treatment Planning and Treated Cases.	Dan C. Peavy, San Antonio, Texas.
10:15 A.M.	Treatment Planning and Treated Cases.	Will Thompson, Jr., Pittsburgh, Pa.
10:45 A.M.	Treatment Planning and Treated Cases.	J. William Adams, Indianapolis, Ind.
11:15 A.M.	Retention. Raymond Webster, Providence, R. I.	
12:30 P.M.	Executive Session.	
2:15 P.M.	Clinics.	

PROGRAM COMMITTEE

DR. GEORGE M. ANDERSON, Chairman.
DR. FREDERICK W. BLACK.
DR. GEORGE R. MOORE.

American Board of Orthodontics

The 1948 meeting of the American Board of Orthodontics will be held at the Deshler-Wallick Hotel, Columbus, Ohio, April 23, 24, 25, and 26. Orthodontists who may desire to be certificated by the Board may obtain application blanks from the Secretary, Dr. Bernard G. deVries, 705 Medical Arts Building, Minneapolis 2, Minnesota.

Northeastern Society of Orthodontists

The annual meeting of the Northeastern Society of Orthodontists will be held at the Chalfont-Haddon Hall, Atlantic City, New Jersey, on Monday and Tuesday, March 1 and 2, 1948.

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists will hold its annual meeting in Wichita, Kansas, Feb. 1, 2, 3, and 4, 1948.

Cincinnati Dental Society

The Cincinnati Dental Society takes pleasure in the announcement of the Cincinnati Dental Society March Clinic and Children's Dental Health Day, March 14, 15, and 16, 1948, Netherland Plaza Hotel.

Orthodontic Directory of the World

The fourteenth edition of the *Orthodontic Directory of the World* is expected to be off the press about April 1, 1948. The editor is Dr. Oren A. Oliver, 1915 Broadway, Nashville, Tennessee.

Expanded Cancer Teaching Program—Ohio State University

Greater development of teaching in the field of oral cancer at Ohio State University's College of Dentistry has been made possible through a grant of $4,990 from the U. S. Public Health Service.

Announced by Dean Wendell D. Postle, the grant is one of the first to a dental college by the Research Grants Division of the National Institute of Health. Administration of the expanded cancer teaching program will be handled by Dr. Hamilton B. G. Robinson, Professor of Oral Diagnosis and Pathology, Ohio State University, College of Dentistry.

The grant, recommended by the National Advisory Cancer Council, will facilitate the teaching of pathology, diagnosis, and therapy of oral cancer by making possible the expanded activity of present personnel and employment of new personnel.

"Clinics, microscopic conferences, seminars, and lectures will be used," Dean Postle said, "these will emphasize the importance of cancer, in general, and oral cancer, in particular."

European Orthodontic Society Congress

The Twenty-Fifth Annual Congress of the European Orthodontic Society of Europe will be held in London on July 14, 15, and 16, 1948. It is hoped that many American friends and colleagues will be able to attend.

Inquiries should be sent to the Honorary Secretary,

Mr. L. Russell Marsh
19, Harcourt House,
19, Cavendish Square,
London, W. 1.

or to the Honorary Treasurer,

Dr. O. Henry
11B, Portland Place,
London, W.1.

European Orthodontic Society Holds First Postwar Meeting

The first postwar meeting of the European Orthodontic Society, founded in 1907, was held at the Eastman Dispensary in Brussels, October 2 and 3. The meeting was attended by orthodontists from England, Norway, Sweden, Holland, Belgium, France, Switzerland, and Spain. Maxwell Stephens of London was elected president of the society, and Russel Marsh was elected secretary.

Table clinics were held and many papers were read, several of them on the subject of extraction of teeth in orthodontic treatment.

It was decided to hold the next meeting in 1948 in London at about the same time as the meeting of the American Dental Society of Europe.

University of Southern California

The University of Southern California, celebrating the fiftieth anniversary of its College of Dentistry on Nov. 7, 1947, in the city of Los Angeles, conferred the honorary degree of Doctor of Science on Dean Willard C. Flemming and Dr. Ernest E. Sloman. Dr. Sloman is the Dean of the College of Physicians and Surgeons, San Francisco. The candidates for the degrees were presented by Pres. Fred D. Fagg, Jr., Dr. Julio Endelman, Dean of the College of Dentistry, and Dr. A. S. Raubenheimer, Educational Vice-President of the University of Southern California.

American Dental Association

What are *you* doing for the dental health of your community? *You* are rendering a fine dental health service to *your* patients. But are you satisfied that for every person you render this fine service there are four, five, or more persons in your community who may be denied the benefits or even the proper knowledge of the benefits to be derived from such health service?

The answer perhaps is, "No, not satisfied, but what can I do about it?" If you teach your own patients the proper care of their mouths and of their children's mouths in addition

to rendering your best prophylactic and restorative service, you are contributing in a large measure to the dental health of your community. You are not, however, contributing *enough* unless you make your influence reach out beyond the confines of your office, beyond your own clientele.

You *may* say that you do not have time to do more—your practice which is most important to your livelihood consumes all of your time. Or you may say, "Let George do it" since you pay dues to your dental society, small though they be, for the protection and benefits derived. This is not a valid answer. "George" cannot do it without *your* help. *You* meet people day in and day out with whom *you* have the most influence in dental matters. Right at your dental chair you can help those other members of your community who never reach a dental chair.

Your practice consists of a cross section of American life—many leaders of your community—civic leaders—clergymen, teachers, politicians, members of parent-teacher organizations and service clubs, physicians, labor leaders, big and small businessmen, and parents. *You* are their dentist and they look to you for dental information. Few if any of them know or realize the enormity of the dental health problem. It is your responsibility to your community and to your profession to inform them.

If you do not have all the correct facts, they are available through your state and A.D.A. councils on dental health. Much *mis*information as to the causes and effects of dental diseases has been disseminated in the past. Little has been told the rank and file of the public of the carefully planned long-term practical program being developed by your state and A.D.A. councils on dental health to improve the dental health of the nation. *You* can bring this authoritative information directly to the people of your community.

You can familiarize yourself with the latest developments in this program by taking an active part in your state and local council on dental health. Read the literature, magazines, and pamphlets available which describe the program—the caries control program, our goals and principles, the progress of fluorine therapy, and other preventive measures. You can participate in the dental health workshops when they are held in your state. Learn the latest accepted terms to explain dentistry's program to your patients. This is your duty to yourself, your profession, and to the public as a doctor—a teacher.

By such a united effort and interest of its individual members, the dental profession can develop and carry out a program for the American people which will be practical and in the best interest of both the dental profession and the public health, and dentists can avoid the foisting of programs sponsored by impractical planners and opportunists.

You can guide the destiny of dental health service in America! It is *your* professional duty to impart the latest authentic dental information to the people of your community and help to counteract misstatements and plans that are inimical to public health and the practice of good dentistry!

THE PROFESSIONAL RELATIONS COMMITTEE
COUNCIL ON DENTAL HEALTH.

Reduction in the consumption of sugar and the application of a solution of sodium fluoride to the teeth of children are among the most effective known means of reducing dental decay which afflicts nine out of each ten persons, a group of scientists reported in the current issue of the *Journal of the American Dental Association.*

A total of 114 dentists, physicians, biochemists, and nutritionists joined in a review of existing scientific knowledge regarding dental decay at a conference sponsored jointly by the University of Michigan and the Kellogg Foundation.

In their report in the A.D.A. Journal, they said that it is now definitely known that dental caries (decay) is caused by acid resulting from the action of microorganisms on carbohydrates, principally sugar, in the mouth.

Experiments are now under way with a large number of possible preventives and new control techniques, but none of these has been tested sufficiently to warrant general use, the report pointed out.

The scientists challenged a number of popular misconceptions regarding the cause of dental decay, pointing out that sickness, general health, or nutritional status has no significant bearing on the process of dental decay.

"In fact," they wrote, "several scientific reports reveal that malnourished persons have a decreased incidence of dental caries."

They attacked the ancient belief that pregnancy and lactation is a cause of dental decay, and questioned the theory that emotional upsets may influence decay of the teeth.

The scientists also swept aside the theory that brushing the teeth alone will prevent dental decay. They said that brushing the teeth must be done immediately after eating to have any effect in inhibiting decay.

Also, they refuted the theory that increased consumption of vitamins and minerals would insure healthy teeth, declaring:

"The ingestion of vitamins and minerals, in amounts in excess of those required for a normal diet, has not been demonstrated to have any relation to dental caries."

They also said that they were unable to find any substantial evidence that uncooked fruits or vegetables and other so-called detergent (cleansing) foods reduced the caries attack rate.

The group reported that topical (local) application of a solution of sodium fluoride to the teeth of child patients had reduced dental decay by an average of 40 per cent. However, they described the use of foods and other preparations for home use containing fluoride salts as inadvisable and pointed out that evidence is still incomplete on the fluorination of domestic water supplies as a means of reducing dental decay.

In regard to sugar, the scientists reported:

"Studies by a number of investigators indicate that the restriction of sugar, either refined or natural, is effective in the control of dental caries. Moreover, the restriction of sugar, either refined or natural, will improve the dietary, provided the caloric intake remains adequate. The harmful effects of sugar, refined or natural, are not reduced by the addition of either vitamins or minerals."

Notes of Interest

Sidney Asher, D.D.S., M.S.D., announces the opening of his new offices at Suite 1014, Uptown Bank Building, 4753 Broadway, Chicago 40, Illinois, in association with Dr. Carl Asher, practice limited to orthodontics.

Travis L. Lanham, D.D.S., wishes to announce the opening of his office at 119 East Harris Street, San Angelo, Texas, practice limited to orthodontics.

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The AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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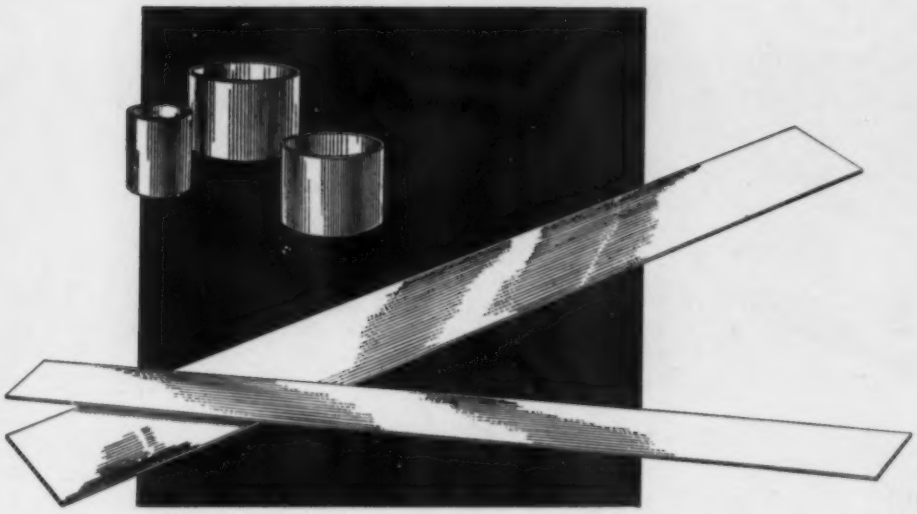

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LABIO-LINGUAL TECHNIC

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430 Pages. — 278 Illustrations. — Price, $10.00

This new book defines and describes under the heading of "Labio-Lingual Technic," the use of the labial and lingual appliances in the treatment of malocclusions. The authors have put into concrete form a technic for the treatment of malocclusions that is sufficiently comprehensive to permit a step-by-step description of the introductory phases, construction, and use of the labial and lingual appliances.

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The moment comes to every man.

The moment when he realizes that he isn't the man he used to be . . .

That the days of his peak earning power are over . . .

That some day not so very far away some younger man will step into his shoes.

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